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FINAL

BASE BACKGROUND STUDY

MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

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LIST OF ACRONYMS AND ABBREVIATIONS

AnB	Alpin Soils
ASTM	American Standard for Testing Materials
AuB	Autryville Soils
BaB, BmB	Baymeade Soils
Baker	Baker Environmental, Inc.
bgs	Below Ground Surface
Ca	Carteret Soils
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy Program
Co	Corolla Soils
Cr	Craven Soils
CrB	Croatan Soils
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
Da	Dorovan Soils
Dc	Duckston Soils
DEM	Division of Environmental Management
DoN	Department of the Navy
EMD	Environmental Management Department
FFA	Federal Facility Agreement
ft/d	Feet Per Day
ft^2/d	Square Feet Per Day
FMFLANT	Fleet Marine Force Atlantic
Fo	Foreston Soils
FSSG	Force Service Support Group
GoA	Goldsboro Soils
gpd	Gallons Per Day
gpm	Gallons Per Minute
GPS	Geographic Positioning System
GSRA	Greater Sandy Run Area
Gt	Grifton Soils
HPIA	Hadnot Point Industrial Area
HSWA	Hazardous and Solid Waste Amendments of 1984
HQW	High Quality Waters
IAS	Initial Assessment Study
IRP	Installation Restoration Program
JPL	Jacksonville Professional Locators
KuB	Kureb Soils

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

La	Lafitle Soils
LANTDIV	Atlantic Division, Naval Engineering Command
Le	Lenoir Soils
Ln	Leon Soils
LUST	Leaking Underground Storage Tank
Ly	Lynchburg Soils
mg/L	Milligrams Per Liter
MaC	Marvyn Soils
MAGTF	Marine Air Ground Task Force
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MEK	Methyl Ethyl Ketone
Mk	Muckalee Soils
msl	Mean Sea Level
MS/MSD	Matrix Spike/Matrix Spike Duplicate
Mu	Murville Soils
NC DENR	North Carolina Department of Environment, and Natural Resources
NeE	Newhan Soils
NFESC	Naval Facility Engineering Service Center
NoA, NoB	Norfolk Soils
NPL	National Priorities List
NREA	Natural Resources and Environmental Affairs
NSW	Nutrient Sensitive Waters
NTR	Navy Technical Representative
NWI	National Wetland Inventory
OD	Outside Diameter
On	Onslow Soils
Pa	Pactolus Soils
PAHs	Polynuclear Aromatic Hydrocarbons
Pn	Pantego Soils
QA/QC	Quality Assurance/Quality Control
Ra	Rains Soils
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
SA	State of North Carolina Surface Water Classification - estuarine water suited for commercial shell fishing and all other tidal saltwater uses
SC	State of North Carolina Surface Water Classification - salt waters protected for secondary recreation, fishing, aquatic life including propagation and survival

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

SCS	Soil Conservation Service
SOPs	Standard Operating Procedures
SSP	Sample Strategy Plan
St	Stallings Soils
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
To	Torhunta Soils
TSD	Treatment, Storage, and Disposal
U.S.C.	United States Code
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USMC	United States Marine Corps
Wo	Woodington Soils
YaA	Yaupon Soils

EXECUTIVE SUMMARY

This document presents the results of the Base Background Study conducted under the direction of Marine Corps Base (MCB), Camp Lejeune, North Carolina and the Atlantic Division, Naval Facilities Engineering Command (LANTDIV). It has been prepared by Baker Environmental, Inc. (Baker) under Contract Task Order (CTO) 0371 of the Department of the Navy's (DoN's) Comprehensive Long-Term Environmental Action Navy (CLEAN) Program.

The background concentrations used for several years at MCB, Camp Lejeune were compiled using data collected from soil borings located upgradient of several Remedial Investigation (RI) sites. It was later discovered that some of the RI sites were contaminated with inorganic substances (i.e., metals). This discovery lead to the suspicion that background sample locations may also have been contaminated but to a lesser degree, therefore, possibly artificially inflating the average background concentration. Based on this suspicion, it was decided that a new base background study should be conducted at MCB, Camp Lejeune and the soil samples would be collected from various locations throughout the base not believed to have been impacted by base activities.

Naturally occurring constituents such as inorganics occur ubiquitously in soil; therefore, distinguishing background levels from site-related concentrations is difficult. Because many naturally occurring inorganic constituents also may be of anthropogenic origin, an appropriate number of background samples were obtained to distinguish naturally occurring concentrations.

Sample locations were located at Camp Lejeune by Baker personnel between June 19, 2000 and June 27, 2000. MCB, Camp Lejeune Range Control and EMD's Fish and Wildlife Division approved these locations. These organizations were consulted to ensure that sampling was not conducted in areas used as active ranges or within protected/endangered habitats. After selection of the sample locations, Jacksonville Professional Locators, Inc. (JPL) visited the locations and determined if each location was clear of all buried underground utilities. If clearance of a sample location was not possible or if the location was in the vicinity of known utilities, the location was offset and clearance was obtained for the offset location. The final location was mapped using a Trimble Pro XR Global Positioning System (GPS).

Surface and subsurface soil samples were collected from 50 soil borings in areas that had no known history of any activity that may artificially inflate inorganic concentrations in surface and subsurface soils. The locations selected for sampling were remote and required the use of a tripod mounted soil sampler operated by Parratt Wolff, Inc, of Hillsboro, North Carolina.

All soil samples retained for analysis were prepared and handled according to USEPA Region 1V Standard Operating Procedures (SOPS) as outlined in the Final SSP (Baker, 2000). The Base Background Study focused on collecting soil samples for inorganic compounds, and pH analysis. The samples were shipped in ice-filled coolers by overnight courier to CompuChem Environmental Laboratories of Cary, North Carolina for analysis. The soil samples were analyzed for Target Analyte List (TAL) inorganics (Method 601 OB/7471A) and pH (ASTM Standard D 4972-95A, US EPA Method 9045). Heartland Environmental Services, Inc, of St. Peters, Missouri, validated results of the inorganic analyses, however, pH results were not submitted for third party validation.

In general, inorganic constituents were detected at similar levels of concentration in the surface and subsurface samples collected as part of this investigation. There are differences between the datasets but these differences are primarily based upon the soil type in each soil horizon. As the soils are separated into datasets based on their soil type, it becomes apparent that the majority of the constituents are more prevalent in the fine-grained soils (clay and silts) than in coarse-grained soils (sands). This was an expected finding since metals are known to attenuate onto clays through the formation of ionic bonds.

The concentrations of aluminum, calcium, magnesium, and iron exceed those for all other constituents analyzed during this investigation. This is not surprising because relatively high concentrations of these analytes have often been detected during previous investigations conducted at the Base. The relatively few detections of cadmium, silver, and thallium indicates that these analytes should be carefully evaluated as to their origin in any investigation. These analytes may be anthropogenic in origin, but do not appear to be common constituents in base soils.

1.0 INTRODUCTION

This document presents the results of the Base Background Study conducted under the direction of Marine Corps Base (MCB), Camp Lejeune, North Carolina and the Atlantic Division, Naval Facilities Engineering Command (LANTDIV). It has been prepared by Baker Environmental, Inc. (Baker) under Contract Task Order (CTO) 0371 of the Department of the Navy's (DoN's) Comprehensive Long-Term Environmental Action Navy (CLEAN) Program.

The background concentrations used for comparison to environmental media sampling results at Installation Restoration Program (IRP) sites at MCB, Camp Lejeune were compiled using data collected from soil borings located upgradient of several Remedial Investigation (RI) sites. It was later discovered that some of the sites were contaminated with inorganics (i.e., metals). This discovery lead to the suspicion that background sample locations may also have been contaminated, but to a lesser degree and therefore, possibly artificially inflating the average background concentration. Based on this suspicion, it was decided that a new Base background study should be conducted at MCB, Camp Lejeune by collecting soil samples from various locations throughout the Base not believed to be impacted by past or present activities.

The field activities conducted as part of this investigation were performed in accordance with the Sample Strategy Plan (SSP) prepared by Baker for this investigation (Baker, 2000) and the Solid Waste Management Unit (SWMU) Confirmatory Sampling Project Plans (Baker, 1997). The samples collected as part of this study are intended to provide the basis for a compilation of data representative of the natural concentration of metals in soils within the boundaries of MCB, Camp Lejeune. The SSP detailed the number and types of samples collected, the analytical methods to be used for those samples, specific sample locations, and the rationale for selecting locations and analyses. Detailed descriptions of the field procedures, sample analysis, and any deviations from planned procedures are outlined in Section 5.0 of this report.

1.1 Base Background Study Objectives

The objectives of the Base Background Study are summarized as follows:

- Determine background levels of inorganic analytes in surface and subsurface soil at MCB, Camp Lejeune;
- Establish statistical distribution of data and identify spatial trends;
- Compare inorganic levels within and between soil associations; and
- Produce a document summarizing the above information to be referenced for future investigations.

The background levels of inorganics in soil presented herein will establish a frame of reference or baseline of data to which inorganics at specific sites may be compared. The need to establish background levels of inorganics in soil is driven by the ubiquitous presence of inorganics in nature. As these analytes occur naturally in soil, it is necessary (during subsequent investigations) to determine if the presence of inorganics at a site are due to site activities (i.e., disposal, spills, etc.) or to natural occurrences. This determination can be made by comparing concentrations of inorganics detected in site soils to Base background levels.

1.2 Report Organization

This report is comprised of text, tables and figures, and the supporting appendices. In addition to Section 1.0, the report is organized into the following sections:

- Section 2.0 - MCB, Camp Lejeune site setting and physical characteristics
- Section 3.0 - Environmental Setting
- Section 4.0 - Base Background Study Design
- Section 5.0 - Base Background Field Investigation
- Section 6.0 - Analytical Results and Statistical Evaluation
- Section 7.0 - Conclusions and Recommendations
- Section 8.0 - References

- Appendix A - Soil Associations
- Appendix B - Test Boring Construction Records
- Appendix C - Groundwater Technical Memorandum
- Appendix D - Chain of Custody Records
- Appendix E - Analytical Data and Statistics for Fine Sand Surface Soils
- Appendix F - Analytical Data and Statistics for Loamy Surface Soils
- Appendix G - Analytical Data and Statistics for Subsurface Sands
- Appendix H - Analytical Data and Statistics for Silts
- Appendix I - Analytical Data and Statistics for Clays
- Appendix J - Analytical Data and Statistics for Combined Surface Soils
- Appendix K - Analytical Data and Statistics for Combined Subsurface Soils
- Appendix L - Analytical Results for QA/QC Samples

2.0 MCB, CAMP LEJEUNE SITE SETTING AND PHYSICAL CHARACTERISTICS

This section presents the history and physical characteristics of MCB, Camp Lejeune. The discussion details the setting, history, and mission of MCB, Camp Lejeune. Information presented in this section was obtained from the available literature.

2.1 MCB, Camp Lejeune

MCB, Camp Lejeune is located within the Coastal Plain Physiographic Province. It is located in Onslow County, North Carolina, approximately 45 miles south of New Bern and 47 miles north of Wilmington. The facility covers approximately 236 square miles. This includes the acquisition of approximately 64 square miles west of the facility within the Greater Sandy Run Area (GSRA) of the county. The military reservation is bisected by the New River, which flows in a southeasterly direction and forms a large estuary before entering the Atlantic Ocean.

The eastern border of MCB, Camp Lejeune is the Atlantic shoreline. The western and northwestern boundaries are U.S. Route 17 and State Route 24, respectively. The City of Jacksonville, North Carolina, borders MCB, Camp Lejeune to the north. The location and boundaries of MCB, Camp Lejeune is depicted in Figure 2-1.

The GSRA is located in the southeast portion of Onslow County, North Carolina, near the Pender-Onslow County border. The GSRA is approximately 31 miles northeast of Wilmington, North Carolina; 15 miles south of Jacksonville, North Carolina; and 5 miles northwest of the Atlantic Ocean. The GSRA is located south and west of MCB, Camp Lejeune, sharing a common boundary along Route 17 between the towns of Dixon and Verona, North Carolina.

The following overview of the Base was taken from the document entitled "Master Plan, Camp Lejeune Complex, North Carolina." The Base consists of 12 identifiable developed areas. Of the developed areas, the Hadnot Point Industrial Area (HPIA) comprises the most concentrated area of development. Directly north of the HPIA are family housing areas concentrated throughout the wooded areas of the central Complex and along the shores of the New River. Also located in this north central area are major personnel support land uses, including the Naval Hospital, school sites, recreational areas, as well as additional family housing areas (Midway Park and Tarawa Terrace I and II).

MCAS New River and Camp Geiger are considered as a single urban area possessing two separate missions and supported by two unrelated groups of personnel. MCAS New River encompasses 2,772 acres and is located in the northwestern section of the Base and lies approximately five miles south of Jacksonville. The MCAS includes air support activities, troop housing and personnel support facilities, all of which immediately surround the aircraft operations and maintenance areas.

Camp Geiger, located directly north of MCAS New River, contains a mixture of troop housing, personnel support and training uses. Currently, the area is utilized by a number of groups which have no direct relationship to one another. The majority of the land surrounding this area is comprised of buffer zones and unbuildable marshland.

MCB, Camp Lejeune contains five other areas of concentrated development, all of which are much smaller in size and population than either the HPIA, MCAS New River, or the Camp Geiger area. The oldest of these is the Montford Point area, which is bounded by the New River to the south and west and by Route 24 on the north. New development in Montford Point has been limited, with most of the facilities for troop housing, maintenance, supply and personnel support having been converted from their intended uses. A majority of the MCB training schools requiring classroom instruction are located here and use surrounding undeveloped areas for training operations when required.

The French Creek area, located directly south of the HPIA, is occupied by the 2nd Force Service Support Group (2nd FSSG). Its activities are directed toward providing combat service and technical support as required by Headquarters, II Marine Expeditionary Force. Expansion of the French Creek Complex is constrained by the Ordnance Storage Depot explosives safety arc on the south and by the regimental area of the HPIA.

Onslow Beach, located along the Onslow Bay, east of the New River Inlet, presents assets for amphibious training as well as recreational use. Courthouse Bay is located on one of a series of small bays formed by the New River. This area is used for maintenance, storage and training associated with amphibious vehicles and heavy engineering equipment. The Engineering School, also located here, conducts training activities in the large open area located to the southeast of the Courthouse Bay.

Another concentrated area of development is the Rifle Range. This area is located on the southwest side of the New River and has only a small number of assigned personnel. It was constructed in the early stages of Base development and is used solely for rifle qualification training. The small group of barracks, located at the Rifle Range, are used for two-week periods by troops assigned to range training.

2.2 History and Mission of Camp Lejeune

Construction of MCB, Camp Lejeune began in 1941 with the objective of developing the "World's Most Complete Amphibious Training Base." Construction of the Base started at the HPIA, where the major functions of the Base are centered. Development at MCB, Camp Lejeune is primarily in five geographical locations under the jurisdiction of the Base Command as mentioned in Section 2.1.

The Base organization functions as the host command to the two Fleet Marine Force Atlantic (FMFLANT) tenant activities, - Headquarters of the II Marine Expeditionary Division, and the 2nd FSSG. The Base host organization is mission is to provide housing, training facilities, logistical support and certain administrative support for tenant units and for other units assigned to MCB, Camp Lejeune and to conduct specialized schools and other training maneuvers, as directed.

The missions of the 6th Marine Expeditionary Brigade, the 2nd Marine Division, and the 2nd FSSG are as follows. The 6th Marine Expeditionary Brigade's mission is to provide the Command element for a brigade-size Marine Air Ground Task Force (MAGTF). The mission of the 2nd Marine Division is to execute amphibious assault operations, and other operations as may be directed, which are supported by Marine aviation and force service support units. With the aircraft wing, the Marine division provides combined arms for service with the Fleet in the seizure or defense of advanced naval bases and for the conduct of land operations essential to the prosecution of a naval campaign.

The mission of the 2nd FSSG is to command, administer and train assigned units in order to provide combat service and technical support as required by Headquarters FMFLANT and its subordinate command in accomplishment of the overall FMFLANT mission.

2.3 Land Use and Demographics

MCB, Camp Lejeune presently covers an area of approximately 236 square miles. Currently, the military population of MCB, Camp Lejeune is approximately 41,000 active duty personnel. The military dependent community is more than 32,000 civilian employees performing facilities management and support functions. The population of Onslow County has grown from 17,738 in 1940, before the formation of the Base, to its present population of 121,350.

During World War II, MCB, Camp Lejeune was used as a training area to prepare Marines for combat. This has been a continuing function of the facility during the Korean and Vietnam Conflicts, and the Gulf War. Toward the end of World War II, the Base was designated as home for the Second Marine Division. Since then, Fleet Marine Forces units also have been stationed here as tenant commands.

The existing land patterns in the various geographic areas within the Base are listed, per geographic area, on Table 2-1. In addition, the number of acres comprising each land use category has been estimated and provided on the table.

2.4 Regulatory History

MCB, Camp Lejeune was placed on the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) National Priorities List (NPL) effective November 4, 1989 (54 Federal Register 41015, October 4, 1989). Subsequent to this listing, the United States Environmental Protection Agency (USEPA) Region IV, the North Carolina Department of Environment and Natural Resources (NC DENR), the DoN and the Marine Corps entered into a Federal Facilities Agreement (FFA) for Base, Camp Lejeune. The primary purpose of the FFA was to ensure that environmental impacts associated with past and present activities at the Base were thoroughly investigated, and that appropriate CERCLA response and Resource Conservation Recovery Act (RCRA) corrective action alternatives were developed and implemented as necessary to protect the public health and welfare, and the environment (MCB, Camp Lejeune FFA, 1989).

MCB, Camp Lejeune was issued a RCRA Part B Permit to operate a hazardous waste container storage facility in September 1984 for the long-term hazardous material/hazardous waste container storage facility (Buildings TP-451 and TP-463). This permit was issued before the

enactment of the Hazardous and Solid Waste Amendments of 1984 (HSWA), which under Section 3004(u) empowers the USEPA to order corrective action at treatment, storage, and disposal (TSD) facilities. This section of the HSWA requires corrective action to be taken for all releases of hazardous waste or hazardous constituents from any SWMU (EnSafe, 1996). MCB, Camp Lejeune generates various hazardous wastes which can generally be classified as waste batteries, waste oil filters, waste solvents, waste paint, discarded commercial chemical products, and others (EnSafe, 1996). Waste batteries are made up of lithium, magnesium, mercury, nickel-cadmium, and electrolyte. Spent lithium batteries, if not deactivated, can be reactive. Magnesium and mercury batteries may be hazardous due to chromium and mercury contents. Nickel-cadmium batteries may be hazardous due to cadmium levels. Waste electrolyte can be generated when lead-acid batteries are drained, wet cell nickel-cadmium batteries are discarded, or when waste electrolyte is discarded. Electrolyte can be hazardous based on corrosivity properties and/or lead or cadmium contents (EnSafe, 1996).

Waste oil filters are routinely generated from vehicle and aircraft maintenance operations. In the past when terne-plated filters were used, they were classified as hazardous waste due to their lead content (EnSafe, 1996).

Solvents such as methyl ethyl ketone (MEK), toluene, xylene, and methylene chloride are used in vehicle, military hardware, and aircraft maintenance. These types of solvents exhibit a RCRA characteristic or are listed as a RCRA hazardous waste (EnSafe, 1996).

Several types of waste paint are generated at the Base: enamel, chemical-resistive coating, epoxy, and oil-based. Some of these waste paints may exhibit a RCRA characteristic and/or contain a RCRA-listed hazardous waste (EnSafe, 1996).

The Naval Hospital located on Base is a major generator of discarded commercial chemical products. Generally, these products are discarded due to expired shelf life. Some of these discarded products may be classified as hazardous waste (EnSafe, 1996).

3.0 ENVIRONMENTAL SETTING

This section presents a discussion of the physical characteristics of MCB, Camp Lejeune. The discussion details the topography and surface features, hydrology, geology, hydrogeology, land usage, climatology, water supply, ecology, wetlands, and threatened and endangered species. This information was obtained from the available literature about MCB, Camp Lejeune.

3.1 Climatology

Although coastal North Carolina lacks distinct wet and dry seasons, there is some seasonal variation in average precipitation (see Table 3-1). July receives the most precipitation and rainfall amounts during summer are generally the greatest. Daily showers during the summer are common, and so are periods of one or two weeks without rain. Convective showers and thunderstorms contribute to the variability of precipitation during the summer months. October receives the least amount of precipitation, on average. Throughout the winter and spring months precipitation occurs primarily as migratory low pressure storms. MCB, Camp Lejeune's average yearly rainfall is approximately 52 inches. Table 3-1 presents a climatic summary of data collected during 35 years (January 1955 to December 1990) of observations at MCAS New River.

MCB, Camp Lejeune experiences hot and humid summers, however, ocean breezes frequently produce cooling effects. The winter months are mild, with occasional brief cold spells. Average daily temperatures range from 38°F to 58°F in January and 72°F to 86°F in July. The average relative humidity, between 75 and 85 percent, does not vary greatly from season to season.

3.2 Topography and Surface Features

The generally flat topography of MCB, Camp Lejeune is typical of the North Carolina Coastal Plain. Elevations on the Base vary from sea level to 72 feet above mean sea level (msl); however, the elevation of most of MCB, Camp Lejeune is between 20 and 40 feet msl. (Figure 3-1)

Drainage at Camp Lejeune is generally toward the New River, except in areas near the coast that drain through the Intracoastal Waterway. In developed areas, natural drainage has been altered by asphalt cover, storm sewers, and drainage ditches. Approximately 70 percent of Camp Lejeune is in broad, flat interstream areas. Drainage is poor in these areas and the soils are often

wet (WAR, 1983). The U.S. Army, Corps of Engineers has mapped the limits of 100-year floodplain at Camp Lejeune at 7.0 feet above msl in the upper reaches of the New River increasing downstream to 11 feet above msl near the coastal area (WAR, 1983).

3.3 Surface Soil Associations

The soil survey report for MCB, Camp Lejeune was prepared by the Soil Conservation Service (SCS) in 1984. Since that time, an updated report for Onslow County was issued by the SCS in 1992. Information provided in this section was obtained from these two reports.

Figure 3.2 shows the general soil associations in Onslow County which includes MCB, Camp Lejeune. A soil association is a landscape that exhibits a distinctive pattern based on soils, drainage and relief. These associations consist of one or more major soil types and at least one minor soil type. The association is then named for the major soil(s). A soil type from one association can exist in other associations, but commonly in a different pattern or percentage.

The two terms, loam and muck, are specifically used to describe soils. A loam is a soil that contains less than 52 percent sand, 28 to 50 percent silt, and 7 to 27 percent clay. A muck is a dark, finely layered, well decomposed, and contains organic soil material.

Six soil associations occur at MCB, Camp Lejeune. The Baymeade-Foreston-Stallings soil association is the most widely distributed soil group at the Base. The other soil associations that are present are the Leon-Murville-Kureb, Muckalee-Dorovan, Wando-Pactolus, Norfolk-Goldsboro-Onslow and Bohicket-Newman. Two other soil associations occur in Onslow County but, not present at MCB, Camp Lejeune (Croatan and Rains-Woodington-Torhunta Associations); however, individual soil types from these last two associations are found at MCB, Camp Lejeune. Detailed information on the specific associations are provided in Appendix A.

3.4 Subsurface Geology

MCB, Camp Lejeune is within the Tidewater region of the Atlantic Coastal Plain physiographic province. The sediments of the Atlantic Coastal Plain consist mostly of interbedded sands, silts, clays, calcareous clays, shell beds, sandstone and limestone. These sediments are layered in interfingering beds and lenses that gently dip and thicken to the southeast to a combined thickness of approximately 1,500 feet. They were deposited in marine or near-shore environments and

range in age from early Cretaceous to Quaternary time. Regionally, the sediments comprise 10 aquifers and nine confining units which overlie igneous and metamorphic basement rocks of the pre-Cretaceous age.

Seven of these aquifers and their associated confining units are present in the MCB, Camp Lejeune area (Cardinell, et al., 1993). Table 3-2 presents a generalized stratigraphic column for Jones and Onslow Counties, North Carolina. Hydrogeologic section location plan and hydrogeologic cross-sections of the MCB, Camp Lejeune area are presented in the Hydrogeologic Framework of U.S. Marine Corps Base at Camp Lejeune, North Carolina (Cardinell, et al, 1993). The following paragraphs provide a description of the lithology of the surficial, Castle Hayne, Beaufort, and Peedee aquifers as presented in the Hydrogeologic Framework of U.S. Marine Corps Base at Camp Lejeune, North Carolina.

The surficial aquifer consists of interfingering beds of sand, clay, sandy clay, and silt of Quarternary and Miocene age that contain some peat and shells. The sand beds that make up the surficial are part of the Belgrade Formation (Table 3-2). The clay, sandy clay, and silt beds observed within the surficial aquifer are thin and discontinuous, and have limited lateral continuity. The general lithology of the surficial aquifer and the absence of any thick, continuous clay beds are indications of good vertical conductivity within the aquifer.

The confining unit for the Castle Hayne aquifer is composed of clay, silt, and sandy clay beds. These beds form a unit across the Base that may be represented by one or more geological units such as the Quaternary or Miocene deposits at the bottom of the surficial aquifer, the uppermost beds of the River Bend Formation or the uppermost beds of the Castle Hayne Formation. In general, the Castle Hayne confining unit at MCB, Camp Lejeune may be described as a group of less permeable beds at the top of the Castle Hayne aquifer that have been partly eroded. This confining unit may only be partly effective in retarding the vertical movement of groundwater between the surficial and Castle Hayne aquifers.

The Castle Hayne aquifer consists of soils from the Castle Hayne Formation of Eocene age and some lower beds of the River Bend Formation of Oligocene age. This aquifer primarily consists of sand, shell rock, and limestone beds. The upper part of the aquifer consists primarily of calcareous sand with some continuous and discontinuous thin clay and silt beds (generally 10 to 15 feet thick). The calcareous sand becomes more limy with depth. The lower part of the aquifer

primarily consists of consolidated or poorly consolidated limestone and sandy limestone interbedded with clay and sand.

The Beaufort confining unit overlies the Beaufort aquifer and consists of clay, silt, and sandy clay or the uppermost sediments of the Beaufort Formation and the lowermost clay and silt beds of the overlying Castle Hayne Formation. The general silty character of this confining unit is very similar to the Castle Hayne confining unit. Although the deeper unit is slightly thicker and is not known to be discontinuous, it also is likely to be only partly effective in retarding the vertical exchange of groundwater between the Beaufort and Castle Hayne aquifers.

The Beaufort aquifer underlies the Beaufort confining unit and the Castle Hayne aquifer and is composed of Paleocene aged soils. These deposits consist of fine to medium glauconitic sand, clayey sand, and clay meds or marine origin, with a few thin (3 to 6 feet) shell and limestone beds. As with other hydrogeologic units, the Beaufort aquifer is not necessarily restricted to a single formation and may include permeable beds of older Cretaceous formations that are in hydraulic connection with the aquifer.

The confining unit for the Peedee aquifer is composed of clay, silt, and sandy clay beds that form the uppermost units of the Peedee Formation. In some places, the confining unit may also include the lowermost beds of the Beaufort Formation.

The Peedee aquifer underlies the Peedee confining unit and the Beaufort aquifer. It is composed primarily of sand of the Peedee Formation (Cretaceous age). A few thin beds of calcareous sandstone, limestone, clay and silt are interlayered with the sand within the Peedee Formation.

The Black Creek confining unit, which underlies the Pedee aquifer, is composed of clay, silty clay and sandy-clay beds. The confining unit's beds belong to the lowermost Pedee Formation and uppermost Black Creek Formation.

The Black Creek aquifer, primarily composed of units from the Black Creek Formation, is formed from thinly-laminated clays interlayered with sands, clean sands and clays and layers including lignitized wood. This aquifer occurs throughout the MCB, Camp Lejeune area, but contains saltwater.

The Black Creek aquifer is underlain by the Upper Cape Fear confining unit and the Upper Cape Fear aquifer. The Upper Cape Fear confining unit is composed of clay and silt beds with local thin sand lenses from layers belonging to the lower Black Creek Formation and the Upper Cape Fear Formation.

The Upper Cape Fear aquifer is present throughout the MCB, Camp Lejeune area and also contains saltwater. The Upper Cape Fear aquifer is composed of 3 to 5 foot layers of sand and clay. The sands in the aquifer range from fine to course with some gravel.

Below the Upper Cape Fear lies the Lower Cape Fear confining unit and the Lower Cape Fear aquifer. The Lower Cape Fear confining unit is beds of silt and clay from the Cape Fear Formation. However, the Upper and Lower Cape Fear aquifers are defined by a difference in head pressure and chloride content. The Lower Cape Fear confining unit may not completely separate these two aquifers.

The lower Cape Fear aquifer contains saltwater and underlies the entire MCB, Camp Lejeune area. The sediments that form the lower Cape Fear aquifer are similar to those in the upper Cape Fear but include thin limestone beds.

As part of this investigation, a total of 50 soil borings were advanced continuously at locations throughout the base. The lithology encountered during the investigation consisted primarily of fine sand with varying amounts of silt and clay. In areas, silty and/or clayey strata predominated. Refer to the boring logs that are presented in Appendix B for information regarding the lithology encountered at the individual soil boring locations. The lithologic conditions at MCB, Camp Lejeune are discussed in further detail and related to the hydrogeologic framework of the region in Section 3-4.

3.5 Hydrogeology

The following paragraphs discuss the hydrogeologic conditions at MCB, Camp Lejeune. The information presented within this section is from literature published by the United States Geological Survey (USGS) (Harned, et al., 1989 and Cardinell, et al., 1993). Additionally, information was collected from a technical memorandum prepared by Baker summarizing groundwater data and aquifer characteristics for MCB, Camp Lejeune (see Appendix C). Table 3-3 provides a summary of estimated hydraulic properties for the Castle Hayne aquifer.

USGS studies at MCB, Camp Lejeune indicate that the area is underlain by sand and limestone aquifers separated by confining units of silt and clay. These aquifers include the surficial (water table), Castle Hayne, Beaufort, Peedee, Black Creek, and upper and lower Cape Fear. Less permeable clay and silt beds function as confining units or semi-confining units that separate the aquifers and impede the flow of groundwater between aquifers.

The surficial unit consists of interfingering beds of sand, clay, sandy clay and silt that contain some peat and shells of Quaternary and Miocene age as described in Section 3-4. These sediments commonly extend to depths of 50 to 100 feet below ground surface (bgs). Thickness of the surficial aquifer in the MCB, Camp Lejeune area ranges from zero to 73 feet, and typically average 25 feet (Cardinell, et al., 1993). The aquifer is generally thickest in the interstream divide areas and may be absent where it is cut by the New River and its tributaries. The clay, sandy clay, and silt beds that occur in the surficial aquifer are thin and discontinuous throughout. A semi-confining unit is found in the surficial aquifer within some portions of MCB, Camp Lejeune.

Recharge to the surficial aquifer is by rainfall. The aquifer receives more recharge in the winter than in the summer when much of the water evaporates or is transpired by plants before it can reach the water table. Most of the surficial groundwater is discharged to local streams, but some water passes through the underlying semiconfining unit. Recharge for the surficial aquifer is based on an average rainfall of 52 inches per year and an average recharge of 30 percent, or an annual recharge of approximately 16 inches per year. The remaining 70 percent of the rainfall is lost as surface runoff or evapotranspiration. Sixteen inches of recharge equates to 7,600,000 gallons per day (gpd) per square mile or approximately 114,000,000 gpd for all of MCB, Camp Lejeune (based on 150 square miles of recharge area). Water levels in the wells tapping the surficial aquifer vary seasonally. The water table is generally highest in the winter and spring, and lowest in the summer and early fall. The lateral hydraulic conductivity for the surficial aquifer was estimated by the USGS at 50 feet per day (ft/day) based on a general soil composition of fine sand mixed with some silt and clay (Cardinal, et al., 1993).

A study of data from aquifer tests (pump tests) done at MCB, Camp Lejeune was conducted by Baker in 1994 to evaluate aquifer characteristics and production capacities. The technical memorandum is provided in Appendix C. The information contained in this memorandum pertains primarily to the surficial aquifer. According to information available at the time the memorandum was composed, the average pumping rates for the surficial aquifer were established

between 0.5 to three gallons per minute (gpm); transmissivity ranged from 7.1 to 7,100 square feet per day (ft^2/day); storativity ranged from 1.5×10^{3} to 7.5×10^{2}; and hydraulic conductivity was estimated to range from 0.5 to 1.4 ft/day. This data indicates that the estimated lateral hydraulic conductivity reported by USGS may be higher than actual conditions in the vicinity of MCB, Camp Lejeune.

Although the aquifer is classified as GA (i.e., existing or a potential source of drinking water supply for humans), it is not used as a potable water source at MCB, Camp Lejeune. The primary reason for it's non-use is because of its low yielding production rates which are typically less than three gpm.

The principal water supply aquifer for MCB, Camp Lejeune is the Castle Hayne aquifer. This aquifer primarily resides within the River Bend Formation which consists of sand, cemented shells and limestone as described in Section 3-4. Buried paleostream channels containing various deposits exist within the aquifer. The top of the aquifer ranges from 10 feet above msl to 70 feet below msl and is irregular over most of the northern portion of MCB, Camp Lejeune. The aquifer is more regular in areas southeast of the New River, where it slopes southeastward. The Castle Hayne thickens to the east, from 160 feet in the Camp Geiger area to more than 400 feet at the eastern boundary of MCB, Camp Lejeune.

The vertical hydraulic conductivity of the Castle Hayne confining unit was estimated to range from 0.0014 to 0.41 ft/d. These values are comparable to those determined for silts and clays and therefore, this unit may only be partly effective at retarding the vertical movement of groundwater between the surficial and Castle Hayne aquifers (Cardinell, et al., 1993).

Estimated transmissivity, hydraulic conductivity and storage coefficient values (unitless) for the Castle Hayne aquifer range from 6,100 to 183,300 gpd/ft, 14 to 91 ft/d and 2×10^{-4} to 1.9×10^{-3}, respectively. An aquifer pump test conducted by ESE (1990) in the HPIA, using an existing water supply well (HP642), indicates an average transmissivity and storage coefficient of 9,600 gpd/ft and 8.8×10^{-4}, respectively (ESE, 1990). Table 3-3 summarizes the previously stated information.

Recharge of the Castle Hayne aquifer at MCB, Camp Lejeune is primarily received from the surficial aquifer. Natural discharge is to the New River and its major tributaries. The Castle

Hayne aquifer provides roughly seven million gallons of water to MCB, Camp Lejeune. Groundwater pumping has not significantly affected natural head gradients in the aquifer.

MCB, Camp Lejeune lies in an area where the upper part of the Castle Hayne aquifer contains freshwater. Saltwater is found in the bottom of the aquifer in the region and in the New River estuary; both are of concern in managing water withdrawals from the aquifer. Over pumping the deeper parts of the aquifer or in areas hydraulically connected to estuarine streams could cause saltwater intrusions. The aquifer underlying most of the area contains water having less than 120 milligrams per liter (mg/L) of chloride.

3.6 Water Supply

Potable water for MCB, Camp Lejeune is supplied entirely by groundwater. Groundwater usage is roughly seven million gpd (Cardinell, et al., 1993). Groundwater is pumped from approximately 77 of 90 water supply wells located within the boundaries of MCB, Camp Lejeune. According to Base personnel, groundwater is treated at five plants located at Hadnot Point, Holcomb Boulevard, MCAS New River, Courthouse Bay, and Onslow Beach having a total capacity of 15.8 million gpd.

All of the water supply wells use the Castle Hayne aquifer. The Castle Hayne aquifer is a highly permeable, semi-confined aquifer that can yield several hundred to 1,000 gpm in municipal and industrial wells in the MCB, Camp Lejeune area. The water supply wells at the Base average 162 feet in depth; eight inches in diameter (casing); and yield 174 gpm (Harned, et al., 1989). The water is typically a hard, calcium bicarbonate type. Information concerning the supply wells was gathered from the Wellhead Management Program Engineering Study 91-36 (Geophex, 1991), the Preliminary Draft Report Wellhead Monitoring Study 92-34 (Greenhorne and O'Mara, Inc., 1992), and interviews with Base personnel.

3.7 Surface Water Hydrology

The following summary of surface water hydrology was originally presented in the Initial Assessment Study (IAS) report (WAR, 1983). The dominant surface water body at MCB, Camp Lejeune is the New River. It receives drainage from most of the Base. The river is short, with a course of approximately 50 miles on the central Coastal Plain of North Carolina. Over most of its course, the New River is confined to a narrow channel entrenched in Eocene and Oligocene

limestones. South of Jacksonville, the river widens as it flows across less resistant sands, clays, and marls. At MCB, Camp Lejeune, the New River flows in a southerly direction into the Atlantic Ocean through the New River Inlet. Several small coastal creeks that are not associated with the New River or its tributaries drain into the area of MCB, Camp Lejeune. The New River, the Intracoastal Waterway, and the Atlantic Ocean converge at the New River Inlet.

Classifications for surface waters in North Carolina have been published under Title 15 of the North Carolina Administration Code. At MCB, Camp Lejeune, the New River falls into three classifications. The portion of the river that passes from the Seaboard Coast Line railroad trestle (located south/southwest of where U.S. Route 17/North Carolina Route 24 crosses the New River) to Montford Point is classified as SC NSW HQW. This classification is defined as salt waters protected for secondary recreation, fishing, aquatic life including propagation and survival (SC) that are nutrient sensitive (NSW) and of high quality (HQW). The portion of the river that resides between Montford Point to a line extending across the river from Grey Point to a point of land approximately 2,200 yards downstream of the mouth of Duck Creek is classified as Class SC NSW. As previously described, these waters are similar to the waters upstream of Montford Point, however they are not considered high quality waters. The remaining portion of the New River is classified as estuarine water suited for commercial shell fishing and all other tidal saltwater uses (SA).

3.8 Ecological Characteristics

The Natural Resources and Environmental Affairs (NREA) Division of MCB, Camp Lejeune, the U.S. Fish and Wildlife Service, and the North Carolina Wildlife Resource Commission have entered into an agreement for the protection of endangered and threatened species that might inhabit MCB, Camp Lejeune. Habitats are maintained at MCB, Camp Lejeune for the preservation and protection of rare and endangered species through the Base's forest and wildlife management programs. Full protection is provided to such species, and critical habitat is designated in management plans to prevent or mitigate adverse effects of Base activities. Special emphasis is placed on habitat and sightings of alligators, osprey, bald eagles, cougars, dusky seaside sparrows, and red-cockaded woodpeckers (WAR, 1983).

Camp Lejeune covers approximately 236 square miles, 84 percent of which is forested (USMC, 1987). Approximately 45 percent of this is pine forest, 22 percent is mixed pine/hardwood forest, and 17 percent is hardwood forest. Nine percent of the Base, a total of 3,587 acres, is wetland and

includes pure pond pine stands, mixed pond pine/hardwood stands, marshes, pocosins, and wooded swamps. The Base also contains 80 miles of tidal streams, 21 miles of marine shoreline, and 12 freshwater ponds. Over half of the 153,000 acres located within the boundaries of MCB, Camp Lejeune are under forestry management. Timber producing areas are under even-aged management with the exception of those areas along streams and swamps. These areas are managed to provide both wildlife habitat and erosion control. Forest management provides wood production, increased wildlife populations, enhancement of natural beauty, soil protection, prevention of stream pollution, and protection of endangered species (WAR, 1983).

Because of the natural resources on the Base, forested areas are actively managed for timber. Game species are also managed for hunting, and ponds are maintained for fishing. Game species managed include wild turkey, white-tailed deer, black bear, grey and fox squirrels, bobwhite quail, eastern cottontail and marsh rabbits, raccoons, and wood ducks.

Aquatic ecosystems on MCB, Camp Lejeune consist of small lakes, the New River estuary, numerous tributaries, creeks, and part of the Intracoastal Waterway. A wide variety of freshwater and saltwater fish species exist here. Freshwater ponds are under management to produce optimum yields and ensure continued harvest of desirable fish species (WAR, 1983). Freshwater fish in the streams and ponds include largemouth bass, redbreast sunfish, bluegill, chain pickerel, yellow perch, and catfish. Reptiles include alligators, turtles, and snakes (including venomous species). Both recreational and commercial fishing are practiced in the waterways of the New River and its tributaries (WAR, 1983).

Many natural communities are present in the coastal plain. Subcommunities and variations of these major community types are also present and alterations of natural communities have occurred in response to disturbance and intervention (i.e., forest cleared to become pasture). The natural communities found in the Camp Lejeune area are summarized as follows:

- Loblolly Pine Forest - a dominant forest type at Camp Lejeune. Pine forest often has a dense hardwood subcanopy and shrub understory because of clear-cutting and/or fire suppression. Dense shading results in a sparse ground layer of vegetation with little probability or rare species occurring (LeBlond et. al., 1994).

- Hardwood Forest - Found primarily in stream floodplains and on slopes and terraces next to stream valleys and estuarine features. Stream floodplain communities include cypress -

gum swamp and coastal plain small stream swamp. Very few rare species are found in hardwood forests, but the communities themselves can be quite rare (LeBlond et. al., 1994).

- Loblolly Pine/Hardwoods Community - The predominant forest type at Camp Lejeune. Second growth forest that includes loblolly pine with a mix of hardwoods - oak, hickory, sweetgum, sour gum, red maple, and holly (oak is the predominant hardwood). These forests have a low probability for rare species because of the lack of herbaceous development and overall plant diversity (LeBlond et. al., 1994).

- Longleaf Pine Forest and Longleaf Pine/Hardwood Forests - Contain critical, fire maintained natural communities: Pine Savanna, Wet Pine Flatwoods, Mesic Pine Flatwoods, Pine/Scrub Oak Sanhill, and Zeric Sanhill Scrub. Some longleaf pine forests have developed in old fields and cut-over areas. The Federal endangered red-cockaded woodpecker (Picoides Borealis) is essentially restricted to opened, burned longleaf pine forests. The pine savannas and wet pine flatwood communities are particularly important habitats for several rare species (LeBlond et. al., 1994).

- Maritime Forest - Develop on the lee side of stable sands and dunes protected from the ocean. Live oak is an indicator species with pine, cedar, yaupon, holly, and laurel oak. Deciduous hardwoods may be present where forest is mature (USMC, 1987).

- Pond Pine Forest - These forests are primarily found in pocosins and are classified by Schafale and Wealkey (1990) as the Pond Pine Woodland natural community. Red bay, sweet bay, and loblolly bay are important components of this community. These forests frequently produce areas of high plant diversity and support several rare species. The Federal endangered loosestrife (Lysimachia asperulifolia) is found in this community (LeBlond et. al., 1994).

- Freshwater Marsh - Occurs upstream from tidal marshes and downstream from non-tidal freshwater wetlands. Cattails, sedges, and rushes are present, On the coast of North Carolina, swamps are more common than marshes (USMC, 1987).

- Salt Marsh - These areas occur in saline tidal areas protected from tidal action by barrier beach features. The barrier islands fronting the Atlantic Ocean support Brackish Marsh,

Upper Beach, Dune Grass, and Maritime Wet and Dry Grassland communities. Regularly flooded, tidally influenced areas dominated by salt-tolerant grasses. Saltwater cordgrass is a characteristic species. Tidal mud flats may be present during low tide. These dynamic communities are critical to such Federal endangered species as the piping plover (Charadrius Melodus) and the Federal threatened American loggerhead turtle (Caretta caretta) and the green turtle (Chelonia Mydas) (LeBlond et. al., 1994).

- Salt Shrub Thicket - High areas of salt marshes and beach areas behind dunes. Subjected to salt spray and periodic saltwater flooding. Dominated by salt resistant shrubs.

- Dunes/Beaches - Zones from the ocean shore to the maritime forest. Subjected to sand, salt, wind, and water.

- Ponds and Lakes - Low depressional areas where water table reaches the surface or where ground is impermeable. In ponds rooted plants can grow across the bottom, Fish populations managed in these ponds include redear, bluegill, largemouth bass, and channel catfish (USMC, 1987).

- Open Water - Marine and estuarine water and all underlying bottoms below the intertidal zone.

3.9 Wetlands

The NC DENR's Division of Environmental Management (DEM) has developed guidance concerning activities that may impact wetlands (NC DENR, 1992). In addition, certain activities affecting wetlands also are regulated by the U.S. Corps of Engineers. The U.S. Fish and Wildlife Service has prepared National Wetland Inventory (NWI) maps for the Camp Lejeune, North Carolina area by stereoscopic analysis of high altitude aerial photographs (USDI, 1982).

Wetland ecosystems at MCB, Camp Lejeune can be categorized into five habitat types: (1) pond pine or pocosin; (2) sweet gum, water oak, cypress, and tupelo; (3) sweet bay, swamp black gum, and red maple; (4) tidal marshes; and, (5) coastal beaches. Pocosins provide excellent habitat for bear and deer because these areas are seldom disturbed by humans. The presence of pocosin-type habitat at MCB, Camp Lejeune is primarily responsible for the continued existence of black bear

in the area. Many of the pocosins are overgrown with brush and pine species that would not be profitable to harvest (WAR, 1983).

Sweet gum, water oak, cypress, and tupelo habitat is found in the rich, moist bottomlands along streams and rivers. This habitat extends to the marine shorelines. Deer, bear, turkey, and waterfowl are commonly found in this type of habitat (WAR, 1983).

Sweet bay, swamp black gum, and red maple habitat exist in the floodplain areas of MCB, Camp Lejeune. Fauna including waterfowl, mink, otter, raccoon, deer, bear, and gray squirrel frequent this habitat (WAR, 1983).

The tidal marsh at the mouth of the New River is one of the few remaining North Carolina coastal areas relatively free from filling or other manmade changes. This habitat, which consists of marsh and aquatic plants such as algae, cattails, saltgrass, cordgrass, bulrush, and spikerush, provides wildlife with food and cover. Migratory waterfowl, alligators, raccoons, and river otter exist in this habitat (WAR, 1983).

Coastal beaches along the Intracoastal Waterway and along the outer banks of MCB, Camp Lejeune are used for recreation and to house a small military command unit. Basic assault training maneuvers are also conducted along these beaches. Training regulations presently restrict activities that would impact ecologically sensitive coastal barrier dunes. The coastal beaches provides habitat for many shorebirds (WAR, 1983).

3.10 Threatened and Endangered Species

Certain species have been granted protection by the U.S. Fish and Wildlife Services under the Federal Endangered Species Act (16 United States Code (U.S.C.) 1531-1543), and/or by the North Carolina Wildlife Resources Commission, under the North Carolina Endangered Species Act (G.S. 113-331 to 113-337). The protected species fall into one of the following status classifications: Federal or state endangered, threatened, or candidate species; state special concern; state significantly rare; or state watch list. While only the Federal or state threatened or endangered and state special concern species are protected from certain actions, the other classified species have the potential for protection in the future.

Surveys have been conducted to identify threatened or endangered species at Camp Lejeune and several programs are underway to manage and protect them. Table 3-4 lists protected species present at the Base and their protected classifications. Of these species, the red-cockaded woodpecker, American alligator, and sea turtles are covered by specific protection programs.

The red-cockaded woodpecker is classified as state endangered. This species requires a specific habitat in mature, living longleaf or loblolly pine trees. The birds exist in family groups and young are raised cooperatively. At Camp Lejeune, 2,512 acres of habitat have been identified and marked for protection. Research on the bird at Camp Lejeune began in 1985 and information has been collected to determine home ranges, population size and composition, reproductive success, and habitat use. An annual roost survey is conducted and 36 colonies of birds have been located.

The American alligator is considered threatened in the northernmost part of its range, which includes North Carolina. The alligator is found in freshwater, estuarine, and saltwater wetlands in Camp Lejeune. Base wetlands are maintained and protected for the alligator. Signs have been erected where alligators are known to live. Annual surveys of Wallace, Southwest, French, Duck, Mill, and Stone Creeks have been conducted since 1977 to identify alligators and their habitats on Base.

Two protected sea turtles, the Atlantic loggerhead and Atlantic green turtle, nest on Onslow Beach at Camp Lejeune and are both classified as threatened species. The green turtle was found nesting in 1980; the sighting was the first time the species was observed nesting north of Georgia. The turtle returned to nest in 1985. Turtle nests on the beach are surveyed and protected, turtles are tagged, and annual turtle status reports are issued.

Four bird species (black skimmer, piping plover, Bachman's sparrow, and peregrine falcon) have also been identified during surveys at Camp Lejeune. The piping plover and peregrine falcon are classified as threatened species. The black skimmer and Bachman's sparrow are classified as special concern (state). The black skimmer and piping plover are sea and shore birds respectively. Skimmers nest on low sandy islands and sand bars along the coast and piping plovers prefer beaches with broad open sandy flats above the high tide line. Skimmers feed above open water and piping plovers feed along the edge of incoming waves. Like the black skimmer and piping plover, Bachman's sparrows are very specific in their habitat requirements. They live in open stretches of pines with grasses and scattered shrubs for ground cover. Bachman's sparrows were observed at numerous locations throughout the southern portion of Camp Lejeune.

In addition to the protected species that breed or forage at Camp Lejeune, several protected whales migrate through the coastal waters off the base during the spring and fall. These include the Atlantic right whale, finback whale, sea whale, and sperm whale. Before artillery or bombing practice is conducted in the area, aerial surveys are made to assure that whales are not present in the impact areas.

A natural heritage resources survey was conducted at Camp Lejeune (LeBlond, 1991) to identify threatened or endangered plants and areas of significant natural interest. From this survey, the rough-leaf loosestrife was the only specie identified that is both Federal and state endangered. Also, several state endangered/threatened and Federal and state candidate species were found on the Base.

4.0 BASE BACKGROUND STUDY DESIGN

Naturally occurring constituents such as metals and metaloids occur naturally and ubiquitously in soil; therefore, distinguishing background levels from site-related concentrations is difficult. Because many naturally occurring inorganics also may be of anthropogenic origin, an appropriate number of background samples were obtained to distinguish naturally occurring concentrations.

Distinguishing naturally occurring constituent concentrations from anthropogenic levels is important for risk management and screening remedial alternatives for sites that may pose risks to human health and/or the environment. Anthropogenic chemicals are defined by the USEPA as chemicals that are present in the environment because of manmade, not-site related sources (e.g., industry, automobiles, etc.). Chemicals of anthropogenic origin may include compounds such as lead, arsenic, DDT, DDE, DDD, and polynuclear aromatic hydrocarbons (PAHs).

This study was designed to establish background concentrations of inorganics in surface and subsurface soils throughout the Base. This section explains the rationale for selecting the number of background surface and subsurface soil samples and discusses any deviations from the approved scope of work as a result of field conditions. Specific locations of background samples will be provided in Section 5.0 of this report.

4.1 Background Investigation Design

Naturally occurring elements such as metals and metaloids occur naturally in soils and distinguishing background levels from site-activity related concentrations often requires statistical analysis. Therefore, the number of background soil samples obtained to determine naturally occurring concentrations of inorganics was selected to support the performance of various statistical tests.

Samples were collected from surface and subsurface soils in the same manner as soils collected for site investigations. Section 4.3 provides details of the sampling procedures employed for this investigation. The proposed number of sample locations was based on the potential for varying lithologies across the Base and the locations of existing or potential investigative sites.

A total of fifty soil sampling locations were proposed in the Final SSP for this project. Sample locations were selected based on knowledge of Base activities, discussions with the Navy

Technical Representative (NTR) and MCB, Camp Lejeune's Environmental Management Department (EMD), and professional judgement. Background sample locations were finalized in the field based on site-specific conditions and upon consultation with MCB, Camp Lejeune Fish and Wildlife Division and MCB, Camp Lejeune Range Control to be sure not to disturb sensitive environments or enter into active range areas.

Surface and subsurface soil samples were collected at each of the soil sampling locations. It was anticipated during the design of the sampling program that each of the six surface soil associations discussed in Section 3.3 and several subsurface soil types would be sampled and represented in the database. Therefore, the database could be segregated by depth (surface versus subsurface), lithologies, and location. The following paragraphs provide detailed discussion of the sampling rationale for the background sampling effort.

4.2 Surface Soil Investigation

A soil survey report for Onslow County was issued by the SCS in 1992 that included the surface soils at MCB, Camp Lejeune. The soil survey indicated that there are six major soil associations made up by several different soil categories within the boundaries of MCB, Camp Lejeune (discussed in detail in Appendix A). Fifty soil samples were collected throughout the Base and were distributed amongst the six soil associations as follows:

- Baymeade-Foreston-Stallings Association — 24 samples
- Leon-Murville-Kureb Association — 9 samples
- Muckalee-Dorovan Association — 1 sample
- Wando-Pactolus Association — 4 samples
- Norfolk-Goldsboro-Onslow Association — 9 samples
- Rains-Woodington-Torhunta Association — 3 samples

Based on careful inspection, it was determined that only the Baymeade-Foreston-Stallings Association, Leon-Murville-Kureb Association, and the Norfolk-Goldsboro-Onslow Association

had enough samples to constitute statistically-valid databases. All fifty samples, however, were collected from soil categories that can be either classified as fine sands or loams. The same fifty soil samples referenced above can be distributed between fine sands and loams as follows:

- Fine Sands (such as Baymead, Kureb, Wando, and Pactolus) 39 samples

- Loams (such as Foreston, Stallings, Leon, Murville, Muckalee, Norfolk, Goldsboro, and Onslow) 11 samples

The division of the surface soils into fine sands and loams forms two statistically-valid databases and, therefore, it was determined that the surface soil sample results would be divided into these two databases.

A separate database was created that includes all fifty surface soil samples combined into a single data set. However, this data set should only be used if the origin of the sample to be compared to background can not be determined. Inorganics are present at different concentrations in loams than in fine sands and the combination of these data sets will result in a range of naturally-occurring inorganics that is not representative of either soil type.

4.3 Subsurface Soil Investigation

A single subsurface soil sample was collected from each of the fifty soil borings advanced throughout the base. The depth of the subsurface soil samples ranged from 1 to 24 feet below ground surface (bgs). The samples were collected above the groundwater table so inorganics in groundwater would not affect the concentrations of inorganics in subsurface soils.

The subsurface samples were divided into three main soil categories. The division of these samples were based on the geologist's description of the soils provided in the boring logs provided in Appendix B. The separation of clay-bearing soils from other soils is particularly important for this investigation. As a consequence of the structure of clay minerals, they are effective ion exchangers. This means that clay rich soils tend to attract positively charged ions such as metals and metaloids. Therefore, inorganic concentrations tend to be much higher in clays or clayey soils than in other soil types.

A description of the soil categories and the number of samples collected from each of the categories are as follows:

- Sand (fine to medium grained sand with trace silt) — 29 samples
- Sand and Silt (fine to medium grained sand with little to some silt) — 12 samples
- Clay (with sand and/or silt fractions) — 9 samples

Trace is defined as 0% to 10% of any minor soil constituent; Little is defined as 10% to 30% of any minor soil constituent; and Some is defined as 30% to 50% of the minor constituent.

These soil categories were split into three separate databases for statistical analysis to illustrate the distribution of background concentrations for each geological unit. As more data becomes available from future investigations, new data can be added to expand the existing databases.

As with the surface soils, the subsurface soils were combined to form a single data set. The purpose of this data set is to provide a comparison for subsurface soil samples that do not have associated soil classifications (i.e., sand, silt, clay, etc.). However, caution should be exercised when using the combined data set for comparison. As described in the previous paragraphs, different soil types have properties that effect ion attraction and retention. Therefore, it is anticipated that the arithmetic mean for the combined data set will be higher than the arithmetic mean for sands and lower than the arithmetic mean for clayey soils. The result of this difference in arithmetic means may result in the listing of a sample result as a contaminant of potential concern instead of indicative of background concentrations, or vice versa. The combination of sample results into this combined data set will dilute the range of inorganics naturally occurring in clays at MCB, Camp Lejeune.

5.0 BASE BACKGROUND FIELD INVESTIGATION

The field investigation began on June 19, 2000 and was completed on July 21, 2000. Soil sampling was conducted in accordance with the approved Final Sample Strategy Plan (Baker, 2000) and applicable procedures and techniques presented in the Final Solid Waste Management Unit (SWMU) Confirmatory Sampling Project Plans (Baker, 1997). The following paragraphs summarize these activities as well as describing any modifications to the approved plans made in response to field conditions.

5.1 Pre-Sampling Activities

Sample locations were marked at MCB, Camp Lejeune by Baker personnel between June 19, 2000 and June 27, 2000. MCB, Camp Lejeune Range Control and EMD's Fish and Wildlife Division approved the locations. As previously mentioned, these organizations were consulted to ensure that sampling was not conducted in areas used as active ranges or within protected/endangered habitats. After selection of the sample locations, Jacksonville Professional Locators, Inc. (JPL) visited the locations and determined if each location was clear of all buried underground utilities. If clearance of a sample location was not possible or if the location was in the vicinity of known utilities, the location was offset and clearance was obtained for the offset location. The final location was mapped using a Trimble Pro XR Geographic Positioning System (GPS). The position of the soil boring was stored as a latitude/longitude reading on the 1983 North Carolina state-plane system.

5.2 Soil Sample Collection

Surface and subsurface soil samples were collected in areas that had no history of activity that could increase naturally occurring concentrations of inorganics in surface and subsurface soils. The locations selected for sampling were often remote and required the use of a tripod mounted soil sampler operated by Parratt Wolff, Inc. of Hillsboro, North Carolina. Baker personnel supervised the advancement of 50 soil borings throughout the Base (Figure 5-1).

Split spoon samplers, with a 2-inch outside diameter (O.D.) and 2 foot length, were driven 24-inches by the tripod rig utilizing a 140-pound hammer. After being advanced, the split spoon sampler was removed from the boring, disassembled and handed to the site geologist for soil description and sample collection. All borings were continuously sampled until a desired soil

type was encountered or to the water table at which point the boring was terminated. All borings were backfilled with bentonite pellets that were hydrated in place by the addition of water.
Soils descriptions were recorded in the field logbook by the field geologist, and later transposed onto boring log records. Classification included characterization of soil type, grain size, color, moisture content and other pertinent information. Lithologic descriptions of site soils are provided on the Test Boring Construction Records in Appendix B.

Surface and subsurface soil samples were collected by compositing small portions of soil removed from the length of the core within the split spoon and placed in laboratory provided, four ounce jars using a stainless steel spoon or spatula. Surface soil samples were collected from zero to one foot below ground surface (bgs) after the first few inches of topsoil and matted roots were removed. Subsurface samples were collected at the target depth which was either within a particular soil horizon or directly above groundwater (the last two feet of unsaturated material in the boring).

Soil samples were labeled and temporarily stored in an ice filled cooler. Samples were collected, and the sample number, collection date and time, and sampler were recorded on the label and the chain-of-custody form. The samples were appropriately grouped and packed in an ice filled cooler and sent by Federal Express overnight service to CompuChem Environmental Laboratories in Cary, North Carolina for metals and pH analysis. Chain-of-custody forms are provided in Appendix D.

5.3 Sample Designation

In order to identify and track the various samples, all samples collected during this investigation were designated with unique numbers. The sample numbers served to identify the type of investigation, location, depth and Quality Assurance/Quality Control (QA/QC) sample types. The sample designation format is as follows:

Investigation - Station # - Depth and QA/QC (if applicable)

An explanation of each of these identifiers is provided below.

Investigation — This designation indicates that the sample was collected as part of the Base Background Study and not some other investigation conducted at the Base.

Station # — Each soil test boring was identified with a unique identification number and located on a map. This number indicates the location that was sampled.

Depth — Depth indicators were used for each soil sample. The indicator references the depth interval of the sample. For example:

00 = ground surface to 1 foot below ground surface
01 = 1 to 3 feet below ground surface
02 = 3 to 5 feet below ground surface
03 = 5 to 7 feet below ground surface
04 = 7 to 9 feet below ground surface
05 = 9 to 11 feet below ground surface

QA/QC — These indicators follow the depth indicator and are used to designate a duplicate or matrix spike/matrix spike duplicate sample was collected. The following indicators were used for designation:

D = Duplicate Sample
MS/MSD = Matrix Spike/Matrix Spike Duplicate

Under this sample designation format, the sample number BASE-BG10-03D refers to:

BASE-BG10-03D — Base Background Investigation

BASE-BG10-03D — Soil sample from soil boring location number 10

BASE-BG10-03D — Sample depth interval 5 to 7 feet below ground surface

BASE-BG10-03D — Duplicate sample was collected for QA/QC

5.4 Quality Assurance/Quality Control (QA/QC) Program

Blank samples provide a measure of contamination that has been introduced into a sample set during the collection, transportation, preparation and/or analysis of samples. Two primary sources on non-site related results include laboratory contaminants and naturally-occurring inorganics. In addition, non-site related operational activities and conditions may contribute to "on-site" contamination.

Equipment rinsates are samples obtained by running organic-free water over/through sample collection equipment after it has been cleaned. Equipment rinsates were collected daily during the field investigation. The results from the rinsates are used to evaluate the decontamination methods.

Field blanks consist of the source water used in decontamination. Field blanks were collected as part of the field program by pouring the water from the container directly into sample bottles. AOC8FB01 was collected from distilled water used for the final rinse for small sampling equipment (i.e., split spoon sampler, stainless steel sampling spoons, etc.) and AOC9FB02 was collected from a potable water source at the base used for decontamination of large equipment (i.e., geoprobe rig, sampling rods) used for the field investigation. Field duplicates were collected, homogenized, and split. Field duplicates were collected at a frequency of 10 percent.

Matrix Spike/Matrix Spike Duplicates (MS/MSD) samples were collected to evaluate the matrix effect of the sample upon the analytical methodology. MS/MSD samples were collected for each group of samples of a similar matrix. MS/MSD samples were collected at a frequency of 5 percent.

5.5 Decontamination Procedures

Equipment decontamination was conducted in accordance with the Final SWMU Confirmatory Sampling Project Plans submitted in August 1997 (Baker, 1997). The drill rigs and split spoon samplers were steam cleaned before the initiation of work and at the end of each working day or before work commenced the next day.

Split spoon samplers and all sampling equipment were decontaminated before work commenced and prior to reuse in accordance with USEPA Region IV guidelines and ASTM D 5088-90. The procedures are summarized as follows:

- Equipment was cleaned with tap water and laboratory detergent (liquinox) using a brush to remove particulate mater and surface film;
- Rinsed thoroughly with tap water;
- Rinsed thoroughly with distilled water;
- Rinsed with pesticide grade isopropanol; and
- Allowed to air dry prior to reuse.

5.6 Analytical Program

All soil samples retained for analysis were prepared and handled according to USEPA Region IV Standard Operating Procedures (SOPs) as outlined in the Final SSP (Baker, 2000). The Base Background Study focused on collecting soil samples for inorganics and pH analysis. The soil samples were analyzed for Target Analyte List (TAL) inorganics (Method 6010B/7471A) and pH (ASTM Standard D 4972-95A, US EPA Method 9045). Heartland Environmental Services, Inc. of St. Peters, Missouri validated results of the inorganic analyses; however, pH results were not submitted for third party validation.

6.0 ANALYTICAL RESULTS AND STATISTICAL EVALUATION

The objective of this section is to present the analytical results of the Base Background Study with respect to inorganics in surface and subsurface soil, and the results of statistical evaluation of this data. The data collected as part of this investigation will provide a basis for evaluating the natural concentrations of inorganics against concentrations associated with site-related contamination. Positive detections are presented in Tables 6-1 through 6-5. Complete data summary tables and frequency of detection tables are presented in Appendices E through I.

6.1 Data Quality

The quality of the data collected as part of this investigation has been assessed for its accuracy and precision with respect to prescribed requirements or specifications. To make these determinations, data quality evaluations were conducted by an independent, third-party, data validator. Data were evaluated in accordance with the criteria established by USEPA guidelines, Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (USEPA, 1988), specific method requirements in OLM02.1, USEPA Region IV modifications, Level D data requirements, and professional judgement. Validation of the analytical data serves to reduce the inherent uncertainties with its usability.

Analytical data were evaluated to determine the usability of the results as well as contractual compliance relative to deliverables and the previously cited requirements. Data validation also provided an interpretation of the reported quality control results. A minimum of ten percent of all laboratory calculations were verified as part of this validation. In addition, all instrument output (e.g., spectra, chromatograms) for each sample were carefully reviewed. Data quality was evaluated based on, but not limited to the following analyses:

- Data completeness
- Holding times
- Calibrations
- Blanks
- Surrogate recoveries
- Laboratory control samples
- Laboratory and field duplicates
- MS/MSD samples

- Internal standard performance
- Constituent Compound identification
- Constituent Compound quantitation

Based upon the results of this evaluation, some analytical results have been "qualified" with regard to usability. Qualified data are typically flagged with a letter qualifier, representing an associated explanatory note needed to clarify the corresponding analytical results. Data qualified as "J" were retained as estimated. Estimated results within a data set are common and considered to be usable by the USEPA (USEPA, 1989). Data may be qualified as estimated for several reasons including an exceedance of holding times, high or low surrogate recovery, or intra-sample variability. In addition, values may be assigned and estimated qualifier if the reported value is below the Contract Required Detection Limit (CRDL) or the Contract Required Quantitation Limit (CRQL). Analytes which were not detected and had inaccurate or imprecise quantitation limits were assigned the "UJ" qualifier. No data obtained during this investigation was rejected by the validator.

6.2 Data Management and Tracking

The management and tracking of samples and subsequent data from the time of field collection to receipt of the validated electronic analytical results is of primary importance for the overall quality of the analytical results. Field samples and their corresponding analytical tests were recorded on the chain-of-custody sheets, included as Appendix D. The chain-of-custody forms were checked against the Final SSP (Baker, 2000) to determine if all designated samples were analyzed for the appropriate parameters. Similarly, the validated information was compared to laboratory information as a final check. In summary, the tracking information was used to identify the following items:

- Identify sample discrepancies between the analysis plan and the field investigation;
- Verify that the laboratory received all samples, and analyzed for the correct parameters;
- Verify that the data validator received a complete data set; and
- Ensure that a complete data set was available for each media of concern prior to entering results into the databases.

6.3 QA/QC Sample Results

As part of the requirements for field quality control under the Naval Facilities Engineering Service Center (NFESC), two types of QA/QC blanks were evaluated: field blanks and equipment rinsate blanks. The analytical results for inorganic parameters for the QA/QC samples are provided in Appendix J.

6.4 Analytical Results

As previously mentioned in Section 5, the surface soil samples were segregated into two data sets based on soil type (fine sands and loams). The following paragraphs compare the analytical findings of these two data sets.

In loamy surface soils (i.e., surface soils containing less than 52 percent sand, 28 to 50 percent silt and 7 to 27 percent clay), the range of background concentrations of aluminum, iron, manganese, selenium, silver and vanadium was higher than those observed in fine sands. Given the fact that the loamy surface soils may contain clay minerals, they are expected to have higher concentrations of aluminum, iron, manganese, and selenium associated with these soils since these metals are prominent constituents of clays. The higher concentrations of silver may be the result of the relatively few detections of this compound within the samples collected as part of the Base Background Study. Silver was only detected in three samples.

Calcium, copper, magnesium, potassium, and zinc concentrations were lower in the loamy surface soils than in the fine sands. It is unknown why copper, magnesium and zinc were lower in soils containing a higher percentage of clay than in soils containing less clay. These analytes have a positive ionic charge and like other metals, are expected to adsorb onto soils containing clay minerals due to the clay's negative ionic charges.

The remaining constituents (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, mercury, nickel, and thallium) were detected at nearly the same concentration in the loamy surface soils as the fine sands. These are the inorganics that have been found during previous investigations to generate human health risk. Therefore, this Background Study will provide a source of comparison for these constituents with respect to overall Base concentrations in soil.

The subsurface soils were divided into three distinctive data sets based on soil composition (i.e., sand, silt and clay). On average, the analytical results for the inorganics detected in the subsurface sands were less than either the silts or the clays, and the clays typically contained the highest concentrations. This ratio is expected because clayey soils typically contain a negative charge and attract positively charged ions. Most metal ions when free in soil are positively charged.

The clays contained higher concentrations of aluminum, antimony, arsenic, barium, beryllium, chromium, cobalt, copper, lead, magnesium, manganese, nickel, potassium, silver, vanadium, and zinc. Calcium, iron, mercury, and selenium were detected at higher concentrations in the silts than in either the clays or sands. Cadmium, sodium and thallium were not detected in any of the subsurface soil samples collected as part of this investigation.

6.5 Statistical Evaluation of Background Data

Many statistical procedures were developed for data sets presumed to have been drawn from a population having a symmetric, bell-shaped, Gaussian or "normal" distribution. It is often the case, however, that environmental datasets are asymmetrical and skewed to the right, or in other words, with a "long tail towards high concentrations". A right-skewed distribution can be transformed to become approximately Gaussian, by using a logarithmic transformation, so that the procedures for normally distributed data can be applied to the transformed data. If the distribution of a data set was not apparent (i.e., normal or lognormal), statistical tests were performed using Statistica® to identify the most appropriate distribution for the data sets.

The W-test was performed for all data sets to aid in the determination of the underlying distribution. The W-test is considered to be an effective method for determining whether a data set can be described as "normally" distributed. Conducting this test on the logarithms of the data is also an effective method of determining whether a data set can be described as being "lognormally" distributed. The W-test evaluates the null hypothesis (i.e., the data set is described by a normal/lognormal distribution versus the data set is not described by a normal/lognormal distribution) and is valid for data sets containing up to fifty samples.

Arithmetic mean, rather than the geometric mean, was calculated for all data sets in the Background Study. The normal and lognormal standard deviations were also calculated for all data sets. The standard deviation is the distance from the mean to either of the two inflection

points of the distribution curve and is used as a descriptive measure of the spread of the values comprising the population. Means and standard deviation were used to calculate the normal and lognormal upper 95 percent confidence limits for the data sets.

The 95 percent upper confidence limit of a mean is defined as a value that, when calculated repeatedly for randomly drawn subsets of a data set, equals or exceeds the true mean 95 percent of the time. Statistical confidence limits are used as a tool for addressing uncertainties of a distribution average. The 95 percent upper confidence limit accounts for uncertainties related to limited sampling data obtained from sites.

Results of the W-Test were inconclusive as to the statistical distribution of the data in some cases. Therefore, Statistica® was used to aid in this determination. Statistica® is a comprehensive, integrated, statistical data analysis, computer program capable of basic and advanced analytic procedures capable of fitting analytical data to known distributions and rigorously evaluating means and standard deviations.

The data generated by Statistica® was then analyzed using linear regression and scatter plots based on a 95% confidence interval and correlation coefficients. Section 6.7 details these analyses.

Sometimes a set of data will have one or more items with unusually large or unusually small values. Extreme values such as these are called outliers. Experienced statisticians take steps to identify outliers and then review each one carefully. An outlier may be an item for which the data has been incorrectly recorded, an item that was incorrectly added to the data set, or it may be an unusual item that has been recorded correctly and does belong in the data set. In the first two cases, the outlier should be removed from the data set and analysis of the data set should be rerun. In the case where the outlier has been recorded correctly and does belong in the data set, the outlier should remain.

In general, the presence of one or more outliers in a data set tends to increase the value of the standard error of the estimate. The procedures for identifying outliers and influential observations provide warnings about the potential effects some observations may have on the regression results. Each outlier and influential observation warrants careful examination. If data errors are found, the errors can be corrected and the regression analysis repeated. Outliers and influential observations should not be removed from the data set unless clear evidence shows that

they are not based on elements of the population being studies and should not have been included in the original data set.

For the purposes of this project, it is not known if samples that contain inorganic concentrations that are detected as outliers are truly background or a result of contamination, therefore all outliers will be removed from the data sets. However, if additional background samples are collected and added to the data set, then these samples should be included as part of the data and the outliers test rerun.

The results of the statistical analyses are presented in Appendix E through K and summarized on Tables 6-6 through 6-10. The summary tables present the constituent, the type of distribution, frequency of detection, range of detection, arithmatic mean (average concentration), two times the average concentration, standard deviation, two times the average deviation, log arithmatic mean, log standard deviation, and two times the log standard deviation.

6.6 Scatter Plots and Linear Regression Analysis

The background data generated at the Base was analyzed using scatter plots and liner regression. A scatter plot is a standard method that is commonly used as a simple screening tool to determine if there is a general relationship between two values (x and y), where a particular value of x is paired with a particular value of y. The general relationship determined using the scatter plot might further be analyzed using a regression analysis. Primarily, a regression analysis is used to determine the relationship between given x and y values and if the relationship is significant. The significance is determined by evaluating the strength of the correlation between the variables (x, y). Correlation is represented using the coefficient of determination (r^2). R^2 values range from 0.0, representing little to no correlation, to 1.0 representing perfect correlation. Four purposes of examining and comparing the background data in this report, even weak correlations provide useful information for comparing data.

For the purposes of this study, the linear regression was used to determine the relationship between different metal concentrations, establish background concentrations, and to present the distribution of background data. The regression lines in conjunction with the scatter plots are useful tools in determining if the analytical results from site samples are within the range of background concentrations. The regression line graphically represents predicted average background of metal concentrations across the base and the scatter plots represent the distribution

of the background data. These plots can be used regardless of whether there is a weak or strong correlation between the comparison metals. They can also be used to determine whether previous and future investigation data falls within the existing distribution of background. This can be done with any data set (big or small) by plotting the data set in the background scatter plat. Data points that fall within the graphical distribution of background are obviously considered background. Any data points that do not fall within this distribution of background will need to be further assessed to determine whether the constituent is a contaminant of potential concern (COPC). Examples of these scatter plots can be found in Appendices E through K.

Example data points were used in the Base Background Surface Soils-Fine Sand scatter plot to show how investigation data may be assessed graphically. If any given data point, as in Sample 3, falls above the background distribution on the graph, it can be said that the aluminum concentration detected in Sample 3 is above background. If any given point, as in Sample 2, falls below the background distribution on the graphics, the same can be said for chromium. Some sample points may be found just outside the distribution of background as in Sample 1. These sample points may not be a concern depending on the actual concentrations and their relationship to the screening criteria.

These scatter plots and liner regression graphs developed in this report will be a useful tool in assessing future investigations at MCB, Camp Lejeune. By plotting future investigation data with the existing background scatter plots, it will be simple to determine what data points or samples fall within Base background concentrations. This report will be a living document and will grow as new background data is collected in future investigations. These scatter plots will be further developed and this tool will be fine-tuned to better understand background concentrations at the Base.

7.0 CONCLUSIONS AND RECOMMENDATIONS

This section summarizes the Base Background Study findings and discusses generalized conclusions from the data collected at MCB, Camp Lejeune. In addition, this section provides recommendations for how the information in this report should be used.

In general, inorganics were detected at similar concentrations in the surface and subsurface samples collected as part of this investigation. There are differences between the data sets, but these differences are primarily based upon the lithology of the soils in each soil horizon. When the soils are separated into data sets based on their lithology, it becomes apparent that the majority of the constituents are more prevalent in the fine-grained soils (clay and silts) than in coarse-grained soils (sands). This was an expected finding since metals are known to attenate onto clays through the formation of ionic bonds.

The concentrations of aluminum, calcium, magnesium, and iron exceed those for all other constituents analyzed during this investigation. This is not surprising because relatively high concentrations of these analytes have often been detected during previous investigations conducted at the Base. The relatively few detections of cadmium, silver, and thallium indicates that these analytes should be carefully evaluated as to their origin in any investigation. These analytes may be anthropogenic in origin, but do not appear to be common constituents in site soils.

The linear regression and scatter plots developed in this report will be a useful tool in assessing future investigations at MCB, Camp Lejeune. By plotting future investigation data with the existing background data in regression and scatter plots, it will be simple to determine which constituents should be considered background. This report will be a living document and will grow with new background data as it is collected in future investigations. New and better regression scatter plots will be developed and this tool will be fine-tuned to better understand background concentrations at the Base.

The following recommendations are based on the findings of this background investigation and should be considered for future environmental investigations at MCB, Camp Lejeune:

- Surface and subsurface soils must be classified appropriately by a trained professional to accurately determine their true composition.

- Sample results must be compared to the proper background data set based on soil classification.

- Inorganics detected in soils at MCB, Camp Lejeune during future investigations should be compared to the inorganic data presented in this report before conducting risk assessments. This will help determine if the concentrations of inorganics detected at a particular site are within the range of background or whether the concentration may be the result of site-related activities.

- If the sample can not be classified regarding its soil type, then comparison to the combined data set may be an alternative. These tables would be helpful in the instance where soils were not described during a field program; however, caution should be exercised when comparing clayey soils to the combined data set since it may falsely indicate that the inorganics within the samples are above background concentrations. The combining of sample results from sands, silts and clays into this combined data set will dilute the range of inorganics naturally occurring in clays at the Base.

8.0 REFERENCES

Baker Environmental, Inc. (Baker). 2000. Final Sample Strategy Plan, Background Study, Marine Corps Base Camp Lejeune, North Carolina. July 2000.

Baker Environmental, Inc. (Baker). 1997. Solid Waste Management Unit (SWMUs) Confirmatory Sampling Project Plans, Marine Corps Base Camp Lejeune, North Carolina. August 1997

CAMA. North Carolina Coastal Management Act of 1974. (1973, c. 1284, s; 1975, c. 452, s; c. 932, s. 2.1). 1974.

Cardinell, Alex P. et al, 1993. Hydrogeologic Framework of U.S. Marine Corps Base at Camp Lejeune, Carolina. U.S. Geological Survey, Water-Resources Investigations Report 93-4049.

Department of the Navy (DoN). 1988. Master Plan, Camp Lejeune Complex, North Carolina. COMBAVFACENGCOM, April 8, 1988.

Environmental and Safety Designs, Inc. (EnSafe). 1996. RCRA Facility Assessment Report for Marine Corps Base Camp Lejeune, North Carolina. Final. Prepared for the Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia. July 25, 1996.

ESE, 1990. Final Site Summary Report, MCB, Camp Lejeune. ESE Project No. 49-02036, September 1990.

Geophex, 1991. Wellhead Management Program Engineering Study 91-36. Prepared for Officer in Charge of Construction, MCB, Camp Lejeune, North Carolina. January, 1991.

Greenhorne and O'Mara, Inc., 1992. Preliminary Draft Report Wellhead Monitoring Study, Engineering Study 92-34. Prepared for Department of the Navy, Civil Branch. December 1992.

Harned, Douglas A., et al, 1989. Assessment of Hydrologic and Hydrogeologic Data at Camp Lejeune Marine Corps Base. North Carolina. U.S. Geological Survey, Water-Resources Investigations Report 89-4096.

LeBlond, Richard, Fussel, John, and Alvin Braswell. 1994. "Inventory of the Rare Species, Natural Communities, and Critical Areas of the Camp Lejeune Marine Corps Base, North Carolina." For the North Carolina Natural Heritage Program, Division of Parks and Recreation, Department of Environment, Health, and Natural Resources. February 1994.

LeBlond, Richard. 1991. "Critical Species List-Camp Lejeune Endangered Species and Special-Interest Communities Survey." Principal Investigator.

MCB, Camp Lejeune Federal Facility Agreement (FFA). December 6, 1989.

North Carolina Department of Environment, Health, and Natural Resources (NC DENR). 1993. Classifications and Water Quality Standards Applicable to Surface Waters of North Carolina. Administrative Code 15A NCAC 2 B. .0200. Division of Environmental Management. February 1993.

North Carolina Department of Environment, Health, and Natural Resources (NC DENR). Interim Guidance for Wetlands Protection. Division of Environment, Water Quality. May 1992.

North Carolina Wildlife Resources Commission (NCWRC). 1992. 1992-1993 Hunting and Fishing Maps for North Carolina Game Lands. June 1992.

Soil Conservation Service. 1984. Soil Survey for MCB, Camp Lejeune, North Carolina.

United States Department of the Interior (USDI). 1982. National Wetland Inventory Map. Camp Lejeune, North Carolina. Fish and Wildlife Service. March 1982.

United States Department of the Interior (USDI). 1993. Correspondence and maps showing units within the Coastal Barriers Resource System. Fish and Wildlife Service.

United States Marine Corps, MCB, Camp Lejeune (USMC). 1987. Multiple-Use Natural Resources Management Plan. Fish and Wildlife Division, Environmental Management Department, Marine Corps Base, Camp Lejeune, North Carolina.

United States Environmental Protection Agency. 1988. Laboratory Guidelines for Evaluating Inorganics Analysis. Prepared for: Hazardous Site Evaluation Division, U.S. Environmental Protection Agency. Compiled by Ruth Bleyer. Prepared by: The USEPA Data Review work Group. July 1988.

USEPA. 1989. United States Environmental Protection Agency. Risk Assessment Guidance for Superfund Volume I. Human Health Evaluation Manual (Part A) Interim Final. Office of Solid Waste and Emergency Response, Washington, D.C. EPA/540/1-89-002. December 1989.

Water and Air Research, Inc (WAR). 1983. Initial Assessment Study of Marine Corps Base Camp Lejeune. North Carolina . Prepared for Naval Energy and Environmental Support Activity.

FIGURES

LEGEND

◆ SOIL BORING LOCATION

SOIL TYPES

AnB	- ALPIN
BmB, BaB	- BAYMEADE
FoA	- FORESTON
KuB	- KUREB
Ln	- LEON
Ly	- LYNCHBURG
MaC	- MARVYN
MK	- MUCKALEE
NoB	- NORFOLK
On	- ONSLOW
Ra	- RAINS
St	- STALLINGS
WaB	- WANDO
Wo	- WOODINGTON

REVISIONS

DRAWN	WJH
REVIEWED	NCB/JSC
S.O.#	62470-371
CADD#	371502AC

NORTH

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

BAKER ENVIRONMENTAL, Inc.
Coraopolis, Pennsylvania

Baker

BASE BACKGROUND SOIL BORING LOCATION MAP
CTO - 0371

SCALE 1" = 4000'

DATE NOVEMBER 2000

FIGURE NO.
5-1

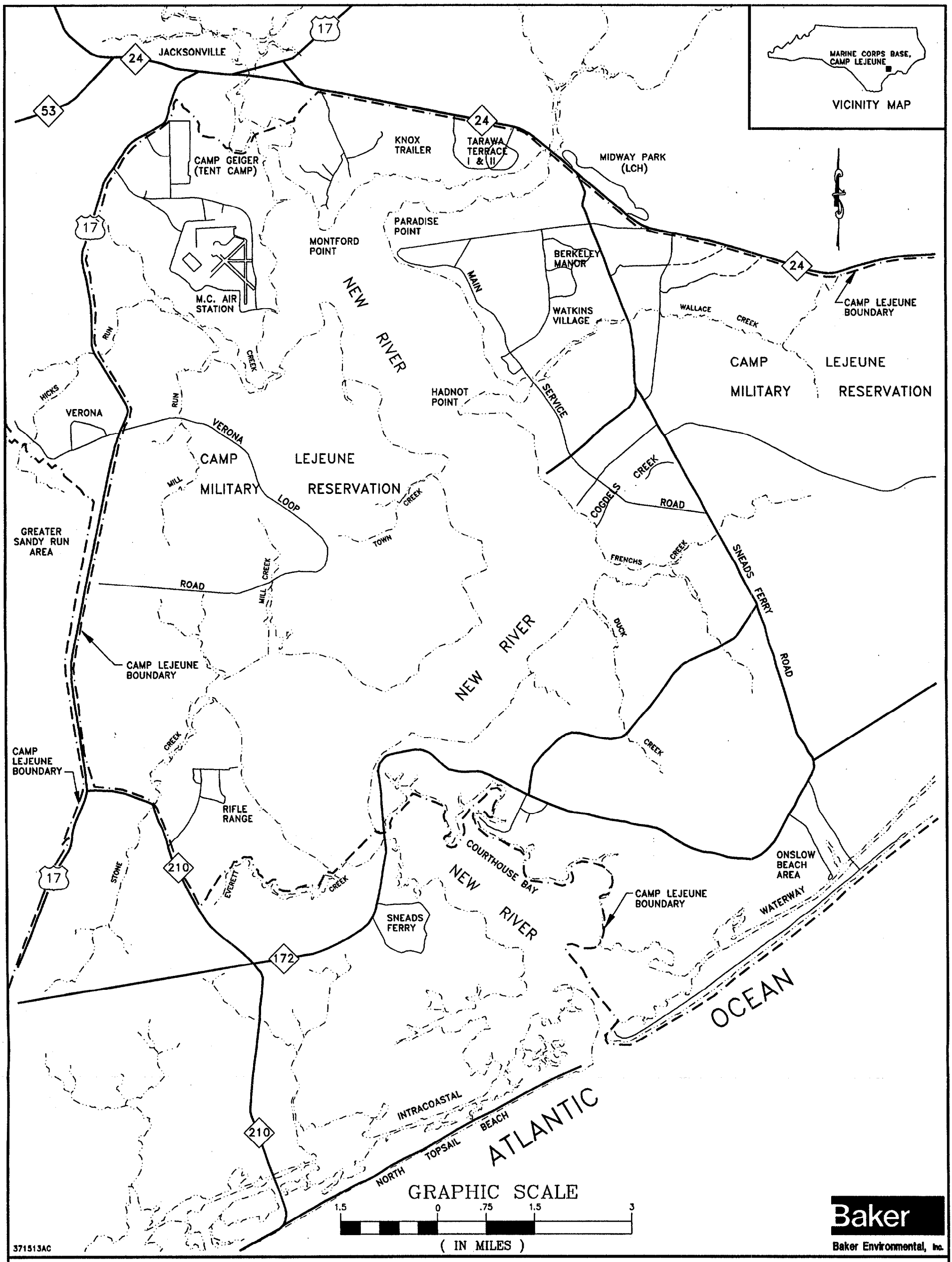


FIGURE 2-1
GENERAL LOCATION MAP
MARINE CORPS BASE, CAMP LEJEUNE
BASE BACKGROUND STUDY REPORT
CTO - 0371

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

03015AB2Z

8000 0 4000 8000

1 inch = 8000 ft.

371515AC

Baker

Baker Environmental, Inc.

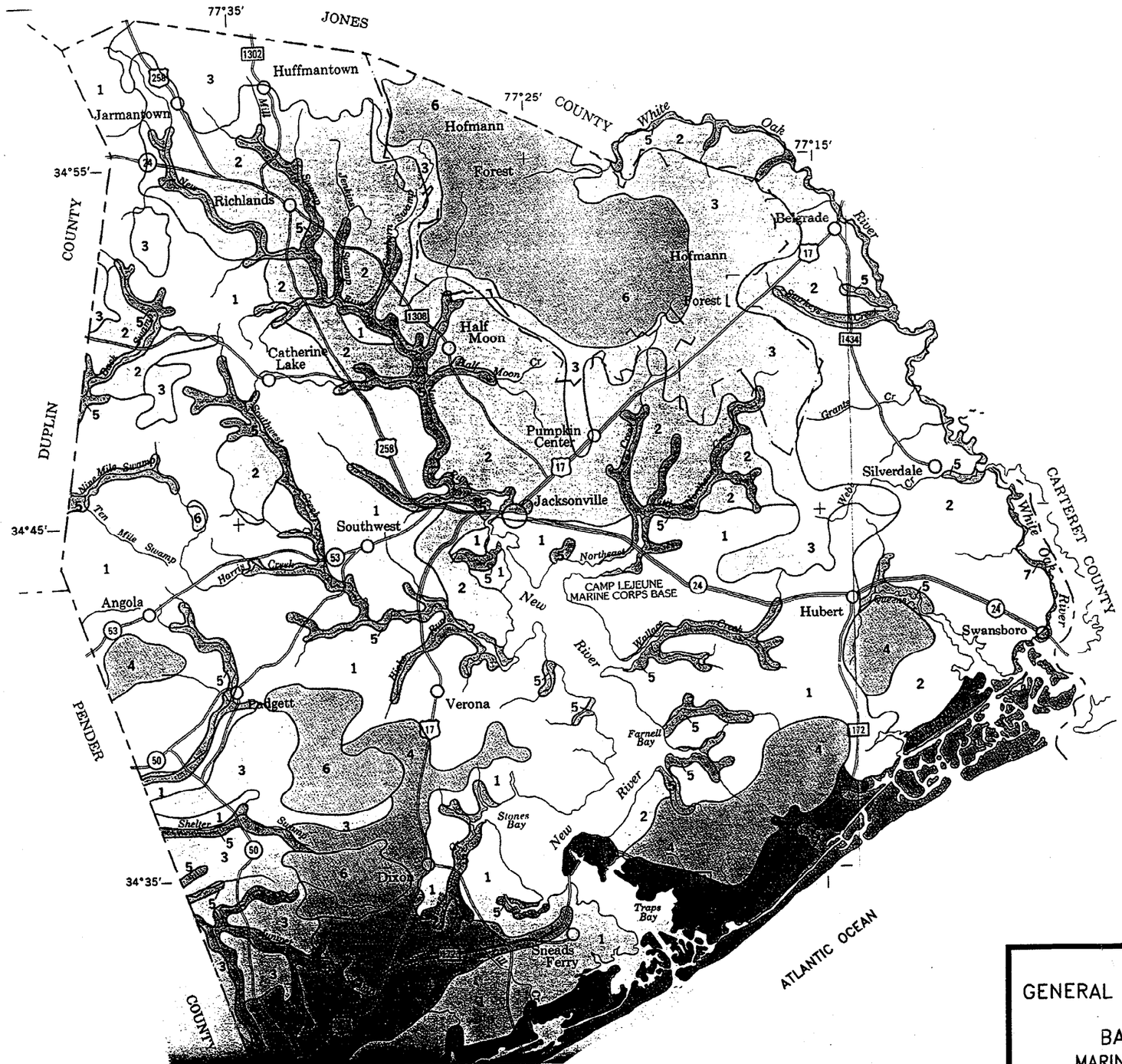
LEGEND

SOURCE: U.S.G.S. QUADRANGLES JACKSONVILLE SOUTH, CAMP LEJEUNE, SNEADS FERRY AND NEW RIVER INLET.

FIGURE 3-1
TOPOGRAPHY OF CAMP LEJEUNE
CTO - 0371
BASE BACKGROUND STUDY

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

371514AC



SOIL LEGEND

1. BAYMEADE-FORESTON-STALLINGS
2. NORFOLK-GOLDSBORO-ONSLOW
3. RAINS-WOODINGTON-TORHUNTA
4. LEON-MURVILLE-KUREB
5. MUCKALEE-DOROVAN
6. CROATAN
7. BOHICKET-NEWHAN
8. WANDO-PACTOLUS

Compiled 1990

SOURCE: SOIL SURVEY OF ONSLOW CO., SCS, 1992.

Baker

Baker Environmental, Inc.

FIGURE 3–2
GENERAL SOIL MAP OF ONSLOW COUNTY
CTO – 0371
BASE BACKGROUND STUDY
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

TABLES

TABLE 2-1

LAND UTILIZATION: DEVELOPED AREAS LAND USE[1]
BASE BACKGROUND STUDY, CTO-0371
MCB, CAMP LEJEUNE, NORTH CAROLINA

Geographic Area	Oper.	Training (Instruc.)	Maint.	Supply/ Storage	Medical	Admin.	Family Housing	Troop Housing	CM	CO	Recreat.	Utility	Total
Hadnot Point	31 (2.9)	15 (1.4)	154 (14.3)	157 (14.4)	10 (0.9)	122 (11.3)	22 (2.0)	196 (18.1)	115 (10.7)	36 (3.3)	182 (16.9)	40 (3.7)	1,080 (100)
Paradise Point	1 (0)		3 (0.4)	1 (0)			343 (34)	19 (1.9)	31 (3.1)		610 (60.4)	2 (0.2)	1,010 (100)
Berkeley Manor/ Watkins Village							406 (80)		41 (8.1)	1 (0.2)	57 (11.2)	2 (0.5)	507 (100)
Midway Park		1 (0.4)		2 (0.7)		2 (0.7)	248 (92.2)		8 (3.0)	3 (1.1)	4 (1.5)	1 (0.4)	269 (100)
Tarawa Terrace I and II			3 (0.5)			1 (0.3)	428 (77.4)		55 (9.9)	11 (2.0)	47 (8.5)	8 (1.4)	553 (100)
Knox Trailer							57 (100)						57 (100)
French Creek	8 (1.4)	1 (0.2)	74 (12.7)	266 (45.6)	3 (0.5)	7 (1.2)		122 (20.9)	22 (3.8)	6 (1.0)	74 (12.7)		583 (100)
Courthouse Bay		**73 (28.6)**	**28 (10.9)**	**14 (5.5)**		**12 (4.7)**	**12 (4.7)**	**43 (16.9)**	**15 (5.9)**	**4 (1.6)**	**43 (16.9)**	**11 (4.3)**	**255 (100)**
Onslow Beach	6 (9.8)	1 (1.6)	3 (4.8)	2 (3.2)	1 (1.6)	2 (3.2)		2 (3.2)	12 (19.3)		25 (40.3)	8 (13.0)	62 (100)
Rifle Range		1 (1.3)	1 (1.3)	7 (8.8)	1 (1.3)	5 (6.3)	7 (8.8)	30 (37.5)	5 (6.3)	1 (1.3)	9 (11.3)	13 (16.3)	80 (100)
Camp Geiger	4 (1.9)	15 (6.9)	19 (8.8)	50 (23.1)		23 (10.6)		54 (25.0)	27 (12.5)	2 (1.0)	16 (7.4)	6 (2.8)	216 (100)
Montford Point	6 (2.6)	48 (20.5)	2 (0.9)	4 (1.7)	2 (0.9)	9 (3.9)		82 (35.2)	20 (8.6)	1 (0.4)	49 (21.0)	10 (4.3)	233 (100)
Base-Wide Misc.	1 (0.8)			87 (68.0)		3 (2.3)			19 (14.8)			18 (14.1)	128 (100)
TOTAL	**57 (1.1)**	**155 (3.1)**	**287 (5.7)**	**590 (11.7)**	**17 (0.38)**	**186 (3.7)**	**1,523 (30.2)**	**548 (10.8)**	**370 (7.4)**	**65 (1.3)**	**1,116 (22.2)**	**119 (2.4)**	**5,033 (100)**

Note:

[1] Upper number is acres, lower number is overall percent.

TABLE 3-1

CLIMATIC DATA SUMMARY
MARINE CORPS AIR STATION, NEW RIVER
MCB, CAMP LEJEUNE, NORTH CAROLINA
BASE BACKGROUND REPORT, CTO-0371

	Precipitation (Inches)			Relative Humidity (Percent)	Temperature (Fahrenheit)			Mean Number of Days With				
								Precipitation		Temperature		
	Maximum	Minimum	Average		Maximum	Minimum	Average	>=0.01"	>=0.5"	>=90F	>=75F	<=32F
January	7.5	1.4	4.0	79	54	34	44	11	2	0	1	16
February	9.1	.9	3.9	78	57	36	47	10	3	0	2	11
March	8	.8	3.9	80	64	43	54	10	3	*	5	5
April	8.8	.5	3.1	79	73	51	62	8	2	1	13	*
May	8.4	.6	4.0	83	80	60	70	10	3	2	25	0
June	11.8	2.2	5.2	84	86	67	77	10	4	7	29	0
July	14.3	4.0	7.7	86	89	72	80	14	5	13	31	0
August	12.6	1.7	6.2	89	88	71	80	12	4	11	31	0
September	12.8	.8	4.6	89	83	66	75	9	3	4	27	0
October	8.9	.6	2.9	86	75	54	65	7	2	*	17	*
November	6.7	.6	3.2	83	67	45	56	8	2	0	7	3
December	6.6	.4	3.7	81	58	37	48	9	2	0	2	12
Annual	65.9	38.2	52.4	83	73	53	63	118	35	39	189	48

Notes:

* = Mean no. of days less than 0.5 days
Source: Naval Oceanography Command Detachment, Asheville, North Carolina. Measurements obtained from January 1955 to December 1990.

TABLE 3-2

GEOLOGIC AND HYDROGEOLOGIC UNITS IN THE COASTAL PLAIN OF NORTH CAROLINA BASE BACKGROUND REPORT, CTO-0371 MCB, CAMP LEJEUNE, NORTH CAROLINA

GEOLOGIC UNITS			HYDROGEOLOGIC UNITS
System	Series	Formation	Aquifer and Confining Unit
Quaternary	Holocene/Pleistocene	Undifferentiated	Surgical Aquifer
Tertiary	Pliocene	Yorktown Formation [1]	Yorktown Confining Unit
			Yorktown Aquifer
	Miocene	Eastover Formation [1]	Pungo River Confining Unit
		Pungo River Formation [1]	Pungo River Aquifer
		Belgrade Formation [2]	Castle Hayne Confining Unit
	Oligocene	River Bend Formation	Castle Hayne Aquifer
	Eocene	Castle Hayne Formation	Beaufort Confining Unit [3]
	Palocene	Beaufort Formation	Beaufort Aquifer
Cretaceous	Upper Cretaceous	Peedee Formation	Peedee Confining Unit
			Peedee Aquifer
		Black Creek and Middendorf Formations	Black Creek Confining Unit
			Black Creek Aquifer
		Cape Fear Formation	Upper Cape Fear Confining Unit
			Upper Cape Fear Aquifer
			Lower Cape Fear Confining Unit
			Lower Cape Fear Aquifer
	Lower Cretaceous [1]	Unnamed Deposits [1]	Lower Cretaceous Confining Unit
			Lower Cretaceous Aquifer [1]
Pre-Cretaceous Basement Rocks		---	---

[1] Geologic and hydrologic units not present beneath Camp Lejeune.
[2] Constitutes part of the surficial aquifer and Castle Hayne confining unit in the study area.
[3] Estimated to be confined to deposits of Paleocene age in the study area.
Source: Cardinell, et al., 1993

TABLE 3-3

HYDRAULIC PROPERTY ESTIMATES OF THE CASTLE HAYNE AQUIFER AND CONFINING UNIT
BASE BACKGROUND REPORT, CTO-0371
MCB, CAMP LEJEUNE, NORTH CAROLINA

Hydraulic Properties	USGS Phase I Study[1]	USGS Aquifer Test[2]	ESE, Inc. [3]	NC DENR Aquifer Test[4]	RASA Estimate[5]
Aquifer transmissivity (cubic foot per day per square foot times foot of aquifer thickness)	4,300 to 24,500 average 9,500	1,140 to 1,325	820 to 1,740 average 1,280	900	10,140 to 26,000
Aquifer hydraulic conductivity (foot per day)	14 to 82 average 35	20 to 60	--	18 to 91 average 54	45 to 80 average 65
Aquifer storage coefficient (dimensionless)	--	2.0×10^{-4} to 2.2×10^{-4}	5.0×10^{-4} to 1.0×10^{-3} average 8.0×10^{-4}	1.9×10^{-3}	--
Confining-unit vertical hydraulic conductivity (foot per day)	--	3.0×10^{-2} to 4.1×10^{-1}	1.4×10^{-3} to 5.1×10^{-2} average 3.5×10^{-3}	--	--

Notes:

(1) Analysis of specific capacity data from Harned and others (1989).
(2) Aquifer test at well HP-708.
(3) Aquifer test at Hadnot Point well HP-462 from Environmental Sciences and Engineering, Inc. (1988).
(4) Unpublished aquifer test data at well X24s2x, from NC DENR well records (1985).
(5) Transmissivities based on range of aquifer thickness and average hydraulic conductivity from Winner and Coble (1989).

Source: Cardinell, et al., 1993.

TABLE 3-4

PROTECTED SPECIES
MCB, CAMP LEJEUNE, NORTH CAROLINA
BASE BACKGROUND REPORT, CTO-0371

Species	Protected Classification
Animals:	
American alligator (Alligator mississippienis)	SC
Bachmans sparrow (Aimophilia aestivalis)	FCan, SC
Green (Atlantic) turtle (Chelonia m. mydas)	T(f), T(s)
Loggerhead turtle (Caretta caretta)	T(f), T(s)
Peregrine falcon (Falco peregrinus)	E(f), E(s)
Piping plover (Charadrius melodus)	T(f), T(s)
Red-cockaded woodpecker (Picoides borealis)	E(f), E(s)
Southern Hognose Snake (Heterodon simus)	FCan, SR
Diamondback Terrapin (Malaclemys terrapin)	FCan, SC
Carolina Gopher Frog (Rana capito capito)	FCan, SC
Cooper's Hawk (Accipiter cooperii)	SC
Eastern Diamondback Rattlesnake (Crotalus adamanteus)	SR
Eastern Coral Snake (Micrurus fulvius)	SR
Pigmy Rattlesnake (Sistrurus miliarius)	SR
Black Bear (Ursus americanus)	SR
Plants:	
Rough-leaf loosestrife (Lysimachia asperulifolia)	E(f), E(s)
Seabeach Amaranth (Amaranthus pumilus)	T(f), T(s)
Chapman's Sedge (Carex chapmanii)	FCan
Hirst's Witchgrass (Dichanthelium sp.)	FCan
Pondspice (Litsea aestivalis)	FCan
Boykin's Lobelia (Lobelia boykinii)	FCan
Loose Watermilfoil (Myriophyllum laxum)	FCan,T(s)
Awned Meadowbeauty (Rhexia aristosa)	FCan,T(s)
Carolina Goldenrod (Solidago pulchra)	FCan, E(s)
Carolina Asphodel (Tofieldia glabra)	FCan
Venus Flytrap (Dionaea muscipula)	FCan
Flaxleaf Gerardia (Agalinis linifolia)	SR
Pinebarrens Goober Grass (Amphicarpum purshii)	SR
Longleaf Three-awn (Aristida palustris)	SR
Pinebarrens Sandreed (Calamovilfa brevipilis)	E(s)
Warty Sedge (Carex verrucosa)	SR
Smooth Sawgrass (Cladium mariscoides)	SR
Leconte's Flatsedge (Cyperus lecontei)	SR

TABLE 3-4 (Continued)

PROTECTED SPECIES
MCB, CAMP LEJEUNE, NORTH CAROLINA
BASE BACKGROUND REPORT, CTO-0371

Species	Protected Classification
Erectleaf Witchgrass (Dichanthelium erectifolium)	SR
Horsetail Spikerush (Eleocharis equisetoides)	SR
Sand Spikerush (Eleocharis montevidensis)	SR
Flaxleaf Seedbox (Ludwigia linifolia)	SR
Torrey's Muhley (Muhlenbergia torreyana)	E(s)
Southeastern Panic Grass (Panicum tenerum)	SR
Spoonflower (Peltandra sagittifolia)	SR
Shadow-witch (Ponthieva racemosa)	SR
West Indies Meadowbeauty (Rhexia cubensis)	SR
Pale Beakrush (Rhynchospora pallida)	SR
Longbeak Baldsedge (Rhynchospora scirpoides)	SR
Tracy's Beakrush (Rhynchospora tracyi)	SR
Canby's Bulrush (Scirpus etuberculatus)	SR
Slender Nutrush (Scleria minor)	SR
Lejeune Goldenrod (Solidago sp.)	SR
Dwarf Bladderwort (Utricularia olivacea)	T(s)
Elliott's Yellow-eyed Grass (Xyris elliottii)	SR
Carolina Dropseed (Sporobolus sp.)	T(s)

Legend:

E(f) = Federal Endangered
T(f) = Federal Threatened
Fcan = Candidate for Federal Listing
E(s) = State Endangered
T(s) = State Threatened
SC = State Special Concern
SR = State Rare

Source: LeBlond, 1994

TABLE 6-1
SUMMARY OF POSITIVELY DETECTED INORGANICS IN FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG02-00	BASE-BG03-00	BASE-BG04-00	BASE-BG05-00	BASE-BG06-00	BASE-BG09-00	BASE-BG10-00	BASE-BG11-00
SAMPLE DATE	7/13/00	7/13/00	7/11/00	7/13/00	7/13/00	7/14/00	7/13/00	7/11/00
METALS (mg/kg)								
Aluminum	1380	2090	8530	2320	3140	190	5390	2540
Antimony	ND	0.27 J	ND	ND	ND	0.26 J	ND	ND
Arsenic	0.73	ND	0.42 J	0.3 J	ND	ND	0.64 J	0.83 J
Barium	6	6.3	14	9.5	6.7	1.6	12	14.1
Beryllium	ND	0.042 J	ND	0.094 J	ND	0.02 J	0.07 J	0.11 J
Cadmium	ND	ND	ND	ND	ND	ND	ND	0.11 J
Calcium	52.7 J	87.6 J	170	17400	152	ND	592	105000
Chromium	0.85	1.9	9.4	2	3	0.51 J	6.4	9.7
Cobalt	0.19 J	ND	0.4 J	0.12 J	0.14 J	ND	0.34 J	0.3 J
Copper	0.73	0.88	1.3	ND	0.83	2.1	1.5	2.9
Iron	365	971	5000	1040	623	126	3830	2420
Lead	3.1 J	3 J	7.4 J	4 J	4.6 J	2.8	5.4 J	38.5 J
Magnesium	27.9 J	47.4 J	274	333	65.3 J	ND	146	1610
Manganese	17	2.1 J	5.1	9.5 J	2.1	ND	6.4 J	25.9
Mercury	ND	0.048	0.038	ND	ND	ND	ND	0.069
Nickel	0.84	0.64	1.6	0.64	0.91	ND	1.4	1.6
Potassium	22.3 J	34.4 J	169 J	45.8 J	73.8 J	ND	88.4 J	263 J
Selenium	ND	ND	0.36 J	ND	0.25 J	ND	ND	0.63 J
Silver	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	ND	ND	ND	ND	ND	ND	ND	307
Thallium	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	1.2 J	2.8	13.4	ND	3.4	1.2 J	9.8	7.7
Zinc	ND	ND	3.8	2.7	ND	1.5 J	3.4	18.4

Notes: ND - Not Detected
mg/kg = Milligrams per Kilogram
J - Resultant concentration is estimated

TABLE 6-1
SUMMARY OF POSITIVELY DETECTED INORGANICS IN FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG17-00	BASE-BG18-00	BASE-BG20-00	BASE-BG21-00	BASE-BG22-00	BASE-BG23-00	BASE-BG24-00	BASE-BG25-00
SAMPLE DATE	7/13/00	7/14/00	7/16/00	7/15/00	7/14/00	7/11/00	7/13/00	7/15/00
METALS (mg/kg)								
Aluminum	2140	894	2520 J	53.9	4270 J	2660	123	1460
Antimony	ND	ND	0.34 J	ND	0.25 J	0.9 J	ND	0.31 J
Arsenic	ND	ND	ND	ND	0.85 J	ND	ND	0.46 J
Barium	6.1	2.4	9.2	2.3	9.2	9.1	3.6	5.7
Beryllium	0.047 J	ND	0.061 J	0.016 J	0.038 J	ND	ND	0.082 J
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	49.4 J	44.2 J	48.6 J	ND	171	3840	327	112
Chromium	1.7	0.98	3.5	ND	4.4	3.3 J	0.42 J	1.4
Cobalt	ND	ND	0.17 J	ND	0.19 J	0.2 J	ND	0.089 J
Copper	1.2	1.1	ND	ND	1.2	18.2	4.1	ND
Iron	858	751	707 J	44	1890 J	1440	106	884
Lead	8 J	4 J	4.3 J	0.45	8.7 J	32.5 J	3 J	7
Magnesium	48.7 J	18.8 J	75.2 J	ND	95.9 J	106	56.2	88.6 J
Manganese	8.7 J	2.6 J	1.6	3.3 J	5.5	18.7	3.1	2.3 J
Mercury	ND	ND	0.032 J	ND	0.04	0.028 J	ND	ND
Nickel	0.48 J	0.24 J	0.11 J	ND	0.9	1.8	ND	0.55
Potassium	27.6 J	15 J	74.2 J	ND	73 J	54.7 J	36.8 J	34.2 J
Selenium	ND	ND	0.63	ND	ND	ND	0.34 J	0.32 J
Silver	ND	ND	ND	ND	ND	ND	ND	0.11 J
Sodium	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	2.4	1.8 J	4.7	0.44 J	6.8	3.6 J	0.49 J	3.8
Zinc	5.2	3	0.36 J	ND	1.9 J	25.4	10.8	5.6

Notes: ND - Not Detected
mg/kg = Milligrams per Kilogram
J - Resultant concentration is estimated

TABLE 6-1
SUMMARY OF POSITIVELY DETECTED INORGANICS IN FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG26-00	BASE-BG27-00	BASE-BG28-00	BASE-BG30-00	BASE-BG31-00	BASE-BG32-00	BASE-BG33-00	BASE-BG34-00
SAMPLE DATE	7/14/00	7/14/00	7/15/00	7/12/00	7/16/00	7/15/00	7/14/00	7/15/00
METALS (mg/kg)								
Aluminum	919	73 J	2870	29.4	6350	1470	31	1820
Antimony	0.37 J	0.26 J	ND	ND	ND	ND	ND	0.28 J
Arsenic	ND	ND	0.35 J	ND	ND	ND	ND	ND
Barium	4.3	0.73 J	6.9	ND	24	2.2	ND	3.5
Beryllium	0.026 J	ND	0.05 J	ND	0.08 J	0.033 J	0.018 J	0.036 J
Cadmium	ND	ND	0.056 J	ND	ND	ND	ND	ND
Calcium	126	12.4 J	2030	ND	67.8 J	ND	ND	67.5 J
Chromium	1.3	ND	4.3	ND	4.1	1.3	ND	1.9
Cobalt	ND	ND	0.16 J	ND	0.26 J	ND	ND	0.12 J
Copper	1.3	ND	1.7	0.9	1.2	ND	ND	2.2
Iron	456	51.4 J	2200	26.3	2670	1030	40.2	836
Lead	3.2	1 J	3.4	0.53 J	5.7	2.3	1.2	2.6
Magnesium	29 J	ND	107	ND	115	38.5 J	ND	53.5 J
Manganese	4.1 J	ND	8.5 J	ND	5	9.4 J	5.2 J	14.2 J
Mercury	ND	0.021 J	ND	ND	0.12 J	ND	ND	ND
Nickel	0.35 J	ND	0.76	ND	1.4	0.31 J	ND	0.53
Potassium	ND	5.8 J	66.3 J	ND	79 J	28.9 J	ND	29.8 J
Selenium	ND	ND	0.37 J	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	1.5 B	0.36 J	5.2	0.14 J	6.5	2.3 J	0.35 J	2.4
Zinc	2.7	ND	3.1	ND	ND	1.8 J	ND	5.4

Notes: ND - Not Detected
mg/kg = Milligrams per Kilogram
J - Resultant concentration is estimated

TABLE 6-1
SUMMARY OF POSITIVELY DETECTED INORGANICS IN FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG35-00	BASE-BG36-00	BASE-BG37-00	BASE-BG38-00	BASE-BG39-00	BASE-BG41-00	BASE-BG42-00	BASE-BG43-00
SAMPLE DATE	7/16/00	7/15/00	7/16/00	7/16/00	7/16/00	7/15/00	7/16/00	7/16/00
METALS (mg/kg)								
Aluminum	2630 J	670	2450 J	54.5	1040	1120	2420	79.6
Antimony	0.46 J	0.28 J	0.55 J	ND	ND	0.48 J	ND	ND
Arsenic	ND	ND	ND	ND	ND	0.37 J	ND	ND
Barium	6	2.2	1.6	0.93 J	4.4	2.5	4.6	1.1
Beryllium	0.06 J	0.033 J	ND	ND	ND	0.037 J	0.041 J	ND
Cadmium	ND	ND	ND	ND	0.037 J	0.064 J	ND	ND
Calcium	423	77.2 J	30.7 J	143	222	402	268	25.3 J
Chromium	2.2	0.9	2.6	0.24 J	1.4	1.7	2.3	0.41 J
Cobalt	0.15 J	ND	ND	ND	ND	ND	0.14 J	ND
Copper	38.5	1.1	ND	0.43 J	0.88	1.2	5.4	0.29 J
Iron	1520 J	434	538 J	40.1	369	724	1090	55.8
Lead	4.3 J	3.9	2.4 J	0.99	5.8	2.1	3.7	1.5
Magnesium	159	32.1 J	19.8 J	21.6 J	24.7 J	42.2 J	81.1 J	9.8 J
Manganese	16.9	2.8 J	ND	0.74 J	1.7	4.5 J	5.8	0.94 J
Mercury	0.04	ND	0.029 J	0.051 J	0.086 J	ND	0.059 J	0.047 J
Nickel	0.62	ND	0.3 J	ND	0.19 J	0.37 J	0.53 J	ND
Potassium	47 J	ND	23.7 J	10.2 J	18.7 J	ND	33.6 J	13 J
Selenium	0.46 J	ND	0.31 J	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	2.4	1.5 J	3.7	0.27 J	1.5 J	1.8 J	2 J	0.54 J
Zinc	3.4	1.3 J	5.3	ND	6.3	1.5 J	73.9	ND

Notes: ND - Not Detected
mg/kg = Milligrams per Kilogram
J - Resultant concentration is estimated

TABLE 6-1
SUMMARY OF POSITIVELY DETECTED INORGANICS IN FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG44-00	BASE-BG45-00	BASE-BG46-00	BASE-BG47-00	BASE-BG48-00	BASE-BG49-00	BASE-BG50-00
SAMPLE DATE	7/16/00	7/17/00	7/13/00	7/16/00	7/12/00	7/12/00	7/12/00
METALS (mg/kg)							
Aluminum	3160	664	478	708	40.8	7280	41.6
Antimony	ND	ND	0.46 J	ND	ND	ND	ND
Arsenic	0.58 J	ND	ND	ND	ND	0.39 J	0.27
Barium	13.8	2.7	2.1	4.5	ND	19.5	ND
Beryllium	0.079 J	0.012 J	ND	0.016 J	ND	0.11 J	ND
Cadmium	ND	ND	ND	ND	ND	ND	ND
Calcium	56.2 J	72.1 J	58.6 J	176	ND	369	ND
Chromium	2.7	1.2	0.7	1.3	ND	6.9	ND
Cobalt	0.13 J	ND	ND	0.11 J	ND	0.37 J	ND
Copper	0.96	0.44 J	4.9	0.89	ND	0.98	ND
Iron	1400	346	298	412	34.8	2290	94.5
Lead	6.1	1.7	5.5 J	2.4	0.57 J	5.2 J	1.4 J
Magnesium	68.9 J	25.8 J	22.2 J	30.1 J	ND	222	ND
Manganese	8.6	2	2 J	8	ND	3.7	0.64 J
Mercury	0.096 J	0.06 J	ND	0.058 J	ND	0.023 J	0.02 J
Nickel	0.58	ND	0.15 J	0.44 J	ND	1.3	ND
Potassium	39.7 J	23.6 J	19.4 J	24.7 J	ND	212 J	ND
Selenium	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND
Sodium	ND	ND	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	ND	ND	ND	ND
Vanadium	3.8	1.6 J	1.2 J	2.7	0.16 J	10.5	0.54 J
Zinc	ND	ND	8.5	ND	ND	3.2	ND

Notes: ND - Not Detected
mg/kg = Milligrams per Kilogram
J - Resultant concentration is estimated

TABLE 6-2
SUMMARY OF POSITIVELY DETECTED INORGANICS IN LOAMY SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG01-00	BASE-BG07-00	BASE-BG08-00	BASE-BG12-00	BASE-BG13-00	BASE-BG14-00	BASE-BG15-00	BASE-BG16-00
SAMPLE DATE	7/11/00	7/13/00	7/16/00	7/11/00	7/11/00	7/12/00	7/16/00	7/13/00
METALS (mg/kg)								
Aluminum	2040	2170	3680 J	9130	5390	3770	4730 J	4820
Antimony	ND	ND	0.32 J	ND	0.49 J	ND	0.3 J	0.34 J
Arsenic	ND	ND	0.62 J	0.73 J	0.49 J	ND	ND	1
Barium	3.9	7.3	16.7	19.6	9.2	12	10	20
Beryllium	ND	0.029 J	0.077 J	0.14 J	ND	ND	0.1 J	0.072 J
Cadmium	ND	ND	ND	ND	ND	ND	ND	0.056 J
Calcium	ND	299	11500	200	75.3 J	344	44.3 J	8720
Chromium	2.7	2.3	4.6	9.6	6.1 J	3.3	5	7.4
Cobalt	ND	ND	0.44 J	0.45 J	0.31 J	0.1 J	0.51 J	0.29 J
Copper	0.33 J	ND	2	2.2	1.6	0.57 J	1.6	5.8
Iron	251	1300	2410 J	6050	7900	2910	1220 J	3940
Lead	3.2 J	12.1 J	8.2 J	9.9 J	5.4 J	5.1 J	7.9 J	26.8 J
Magnesium	25.9 J	45.4 J	286	241	130	114 J	131	330
Manganese	0.81 J	1.3 J	49	7.3	3.1	5.3	2.5	13.6 J
Mercury	0.041	ND	0.052	0.06	ND	0.032 J	0.061	ND
Nickel	0.31 J	0.42 J	1.2	1.7	0.83	0.49 J	0.72	1.4
Potassium	46.4 J	35.9 J	139	168 J	162	61.7 J	124	102
Selenium	ND	ND	0.43 J	0.73 J	0.38 J	0.42 J	0.8	ND
Silver	ND	ND	ND	ND	0.097 J	ND	ND	1.1
Sodium	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	3.3	4.1	7.6	16.6	12.4 J	4.8	5.6	9.1
Zinc	ND	3.5	6	4.8	4.3	2.8	1 J	25.2

Notes: ND - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant concentration is estimated

TABLE 6-2
SUMMARY OF POSITIVELY DETECTED INORGANICS IN LOAMY SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG19-00	BASE-BG29-00	BASE-BG40-00
SAMPLE DATE	7/14/00	7/12/00	7/16/00
METALS (mg/kg)			
Aluminum	5680	2070	17600 J
Antimony	ND	ND	0.6 J
Arsenic	0.83 J	ND	1.3 J
Barium	15.2	5.9	15.7
Beryllium	0.075 J	ND	0.53 J
Cadmium	ND	ND	ND
Calcium	726	4210	80.5 J
Chromium	7.2	2.8	12.6
Cobalt	0.21 J	0.1 J	0.36 J
Copper	1.5	1.6	1.4
Iron	3280	1660	12200 J
Lead	11.7	3.8 J	8.7 J
Magnesium	193	92 J	226
Manganese	5.4 J	28	6.3
Mercury	ND	ND	0.11
Nickel	0.96	ND	1.5
Potassium	135	58.9 J	133 J
Selenium	0.28 J	ND	3.4
Silver	ND	ND	0.21 J
Sodium	ND	ND	ND
Thallium	ND	ND	ND
Vanadium	11.1	4.8	26.2
Zinc	5.2	5.7	2.1 J

Notes: ND - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant concentration is estimated

TABLE 6-3
SUMMARY OF POSITIVELY DETECTED INORGANICS IN SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-120

SAMPLE ID	BASE-BG06-05	BASE-BG08-05	BASE-BG09-05	BASE-BG10-03	BASE-BG12-04	BASE-BG16-04	BASE-BG18-02	BASE-BG19-04	BASE-BG20-01
SAMPLE DATE	7/13/00	7/16/00	7/14/00	7/13/00	7/11/00	7/13/00	7/14/00	7/14/00	7/16/00
METALS (mg/kg)									
Aluminum	3330	1570 J	7640	1410	1740	1200	260 J	4620	4070 J
Antimony	ND	0.41 J	ND	0.35 J	ND	ND	ND	ND	ND
Arsenic	1.1	ND	ND	ND	ND	ND	ND	0.88 J	ND
Barium	18.2	3.4	7.9	2	3.9	3.2	1.2	5.3	10.4
Beryllium	ND	ND	0.097 J	0.028 J	ND	0.024 J	ND	0.058 J	0.062 J
Calcium	61.3 J	22.8 J	ND	63.2 J	ND	73.6 J	12.7 J	ND	87.2 J
Chromium	5.2	3.2	7.5	1.6	1.8	1.6	0.83	5.3	7.8
Cobalt	0.1 J	ND	0.35 J	ND	0.11 J	ND	ND	0.14 J	0.21 J
Copper	1.4	ND	ND	ND	0.24 J	ND	ND	ND	0.95
Iron	2410	1130 J	1330	356	329	481	121 J	1580	840 J
Lead	3 J	2.5 J	5.1	1.9 J	1.9 J	1.8 J	1.3 J	3.3	5.1 J
Magnesium	78.1 J	63.3 J	214	46.9 J	44.7 J	38.5 J	16.8 J	130	144
Manganese	1.4	2	3.7 J	1.3 J	2	1.6 J	1.9	2 J	4.7
Mercury	ND	0.029 J	ND	ND	0.022 J	ND	ND	ND	0.031 J
Nickel	ND	ND	1.2	0.2 J	0.37 J	0.34 J	ND	0.55 J	0.39 J
Potassium	66 J	57.9 J	292	32 J	53.6 J	31.8 J	17.6 J	130	176
Selenium	0.27 J	0.4 J	ND	ND	ND	ND	ND	0.26 J	0.44 J
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	7.4	7.7	6.3	1.7 J	1.9 J	2.3 J	0.75 J	7.6	13.7
Zinc	ND	ND	4.2	ND	ND	ND	ND	1.5 J	0.33 J

Notes: ND - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant Concentration is Estimated

TABLE 6-3
SUMMARY OF POSITIVELY DETECTED INORGANICS IN SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-120

SAMPLE ID	BASE-BG21-02	BASE-BG22-04	BASE-BG23-01	BASE-BG25-01	BASE-BG26-03	BASE-BG27--	BASE-BG30-01	BASE-BG31-04	BASE-BG33-02
SAMPLE DATE	7/15/00	7/14/00	7/11/00	7/14/00	7/14/00	7/14/00	7/12/00	7/16/00	7/14/00
METALS (mg/kg)									
Aluminum	8640	5810 J	9900	1340	3630	4640 J	3800	407	1100 J
Antimony	ND	0.31 J	0.31 J	0.2 J	0.32 J	0.4 J	ND	ND	0.26 J
Arsenic	ND	ND	0.92 J	ND	ND	0.34 J	ND	ND	ND
Barium	7.1	7.4	13.9	4	6.8	15.3	1.8	1.4	1.6
Beryllium	0.081 J	0.07 J	ND	0.028 J	0.049 J	0.07 J	ND	ND	ND
Calcium	ND	41.6 J	499	83.8 J	ND	71.3 J	ND	21.3 J	ND
Chromium	9.4	7.4	9.6 J	1.5	4.2	4.5	6.1	1	1.3
Cobalt	0.74	0.22 J	0.84	ND	0.2 J	0.6	ND	ND	0.16 J
Copper	ND	ND	3.1	0.25 J	2.8	1.7	0.58	0.47 J	ND
Iron	1770	877 J	4600	953	1530	3440 J	93.1	222	485 J
Lead	6	4.1 J	4 J	1.9	2.8	3.5 J	3.6 J	1.6	1.1 J
Magnesium	193	166	197	65.5 J	101 J	216	16.9 J	22.6 J	39 J
Manganese	5.9	2.8	4.5	2.2	2.4 J	7.1	0.75 J	1 J	2.3
Mercury	0.061	ND	0.024 J	0.025 J	ND	0.022 J	0.039	0.042 J	0.021 J
Nickel	1.9	0.37 J	3.6	0.44 J	0.95	1.6	0.26 J	ND	0.64
Potassium	190	235	189	33.4 J	64.2 J	121	28.5 J	22.6 J	22.4 J
Selenium	ND	0.24 J	ND	ND	ND	0.32 J	0.31 J	ND	0.29 J
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	7.1	8.6	11.7 J	2.4	5.4	8.9	3	1.1 J	1.4 J
Zinc	3.4	0.84 J	5.1	ND	2.5	1.8 J	ND	ND	ND

Notes: ND - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant Concentration is Estimated

TABLE 6-3
SUMMARY OF POSITIVELY DETECTED INORGANICS IN SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-120

SAMPLE ID	BASE-BG34-03	BASE-BG35-01	BASE-BG36-01	BASE-BG37--	BASE-BG38-01	BASE-BG39-01	BASE-BG42-01	BASE-BG43-03	BASE-BG44-03
SAMPLE DATE	7/15/00	7/16/00	7/15/00	7/16/00	7/16/00	7/16/00	7/16/00	7/16/00	7/16/00
METALS (mg/kg)									
Aluminum	2200	1210 J	9670	3720 J	372	2470 J	3500	1620	6450
Antimony	0.28 J	0.23 J	ND	ND	ND	0.27 J	ND	ND	ND
Arsenic	ND	ND	1.4	ND	ND	ND	0.37 J	ND	ND
Barium	4	3.2	12.7	4.2	0.67 J	4	5.9	1.8	8
Beryllium	0.038 J	0.015 J	0.068 J	ND	ND	0.013 J	0.054 J	ND	0.04 J
Calcium	ND	112	66.7 J	29.2 J	41.6 J	28 J	159	28.3 J	42.7 J
Chromium	2.5	1.4	13.2	4.4	1.2	2.7	2.2	1.7	7.1
Cobalt	0.24 J	ND	1	0.23 J	ND	0.14 J	ND	0.11 J	0.26 J
Copper	ND	0.67	ND	ND	0.23 J	ND	3.3	1.2	0.75
Iron	624	715 J	4310	1380 J	81.5	626 J	1120	611	1720
Lead	1.4	1.7 J	5.2	2.6 J	1.6	2.2 J	3.5	1.5	3.2
Magnesium	86.3 J	54.8 J	209	106 J	13.5 J	87.1 J	87 J	30.1 J	167
Manganese	3.9 J	2.7	4.2 J	2	1.1 J	1.8	4.2	1.3	2.6
Mercury	ND	0.025 J	ND	0.026 J	0.06 J	0.021 J	0.061 J	0.055 J	0.054 J
Nickel	0.66	ND	3	0.94	ND	0.12 J	0.52 J	0.71	0.8
Potassium	51.1 J	37.2 J	124	66.9 J	16 J	44.8 J	31 J	22.4 J	121 J
Selenium	ND	ND	0.46 J	0.47 J	ND	ND	ND	ND	ND
Silver	ND	ND	0.1 J	ND	ND	ND	ND	ND	ND
Vanadium	2.3	1.4 J	11.9	4.6	0.6 J	2.6	2 J	1.7 J	7.1
Zinc	1.1 J	ND	2.3	ND	ND	ND	7.9	ND	4.2

Notes: ND - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant Concentration is Estimated

TABLE 6-3
SUMMARY OF POSITIVELY DETECTED INORGANICS IN SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-120

SAMPLE ID	BASE-BG48-01	BASE-BG50-01
SAMPLE DATE	7/12/00	7/12/00
METALS (mg/kg)		
Aluminum	3640	4680
Antimony	ND	ND
Arsenic	ND	ND
Barium	1.8	3.3
Beryllium	ND	ND
Calcium	ND	ND
Chromium	6.1	6.1
Cobalt	ND	0.41 J
Copper	0.52 J	ND
Iron	251	1160
Lead	3.4 J	2.8 J
Magnesium	28.7 J	58.6 J
Manganese	1.1	3.7
Mercury	0.044	0.042
Nickel	0.51 J	2
Potassium	34.3 J	46.4 J
Selenium	0.32 J	ND
Silver	ND	ND
Vanadium	3	6.4
Zinc	ND	ND

Notes: ND - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant Concentration is Estimated

TABLE 6-4
SUMMARY OF POSITIVELY DETECTED INORGANICS IN SUBSURFACE SILTS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG01-02	BASE-BG04-02	BASE-BG14-01	BASE-BG24-01	BASE-BG28-02	BASE-BG29-02	BASE-BG32-03	BASE-BG40-01	BASE-BG41-01
SAMPLE DATE	7/11/00	7/11/00	7/12/00	7/13/00	7/15/00	7/12/00	7/15/00	7/16/00	7/15/00
METALS (mg/kg)									
Aluminum	2830	4660	4500	5260	16800	8160	2540	4780	3310
Antimony	ND	ND	ND	ND	0.47 J	ND	ND	ND	ND
Arsenic	ND	ND	ND	ND	1.9	0.42 J	ND	ND	0.43 J
Barium	5.2	10.5	15.6	3.2	23.1	16.6	0.92 J	5.7	3.1
Beryllium	ND	ND	ND	0.023 J	0.15 J	ND	0.16 J	0.036 J	0.046 J
Calcium	ND	104 J	4950	ND	557	98.7 J	ND	37.3 J	82.6 J
Chromium	2.8	5.6	4.6	5.2	22.5	9.7	2.5	4.4	4.8
Cobalt	ND	0.22 J	0.23 J	0.25 J	0.68	0.43 J	0.14 J	0.41 J	ND
Copper	ND	0.44 J	1.2	ND	3	1.9	1.6	0.59 J	ND
Iron	322	1290	2720	1370	15600	4120	102	1440	776
Lead	3.1 J	5.2 J	8.7 J	2.6 J	8.1	6.2 J	1	2.6	3.3 J
Magnesium	62.3 J	151	190	55.2 J	525	266	ND	123 J	24.4 J
Manganese	1.1	3	17.2	1 J	6.9 J	3.9	3.5 J	1.9	0.74 J
Mercury	0.041	0.03 J	0.027 J	ND	ND	ND	ND	0.085 J	ND
Nickel	0.33 J	0.76	1	2	2.8	1.4	ND	1.2	0.42 J
Potassium	45.7 J	131 J	102 J	33.6 J	434	264 J	ND	63.5 J	17.4 J
Selenium	0.25 J	ND	0.3 J	ND	0.77	0.42 J	0.27 J	ND	ND
Silver	ND	ND	ND	ND	0.24 J	ND	ND	ND	ND
Vanadium	3	5.1	7.2	9.9	33.9	14	0.35 J	5.7	2 J
Zinc	ND	ND	6.9	ND	7.4	6.1	ND	ND	ND

Notes: ND - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant concentration is estimated

TABLE 6-4
SUMMARY OF POSITIVELY DETECTED INORGANICS IN SUBSURFACE SILTS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG45-01	BASE-BG46-02	BASE-BG49-02
SAMPLE DATE	7/17/00	7/13/00	7/12/00
METALS (mg/kg)			
Aluminum	4890	1450	9510
Antimony	ND	ND	ND
Arsenic	3.2	ND	2.6
Barium	5.7	1.4	12.1
Beryllium	0.042 J	0.039 J	0.22 J
Calcium	42 J	ND	256
Chromium	9	1.9	15.9
Cobalt	0.13 J	ND	0.39 J
Copper	0.72	ND	2.2
Iron	2490	1250	6550
Lead	4.2	1.8 J	5.3 J
Magnesium	168	14.9 J	367
Manganese	2.6	0.57 J	5.7
Mercury	0.16 J	ND	0.034 J
Nickel	0.5 J	0.13 J	0.97
Potassium	120 J	11.9 J	546 J
Selenium	ND	ND	ND
Silver	ND	ND	0.12 J
Vanadium	6.6	3.2	17.1
Zinc	3.3	ND	5

Notes: ND - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant concentration is estimated

TABLE 6-5
SUMMARY OF POSITIVELY DETECTED INORGANICS IN SUBSURFACE CLAYS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG02-03	BASE-BG03-02	BASE-BG05-02	BASE-BG07-03	BASE-BG11-03	BASE-BG13-03	BASE-BG15-03	BASE-BG17-04	BASE-BG47-04
SAMPLE DATE	7/13/00	7/13/00	7/13/00	7/13/00	7/11/00	7/11/00	7/16/00	7/13/00	7/16/00
METALS (mg/kg)									
Aluminum	6000	10700	10900	6860	8800	14900	15600 J	6850	5290
Antimony	ND	ND	ND	0.28 J	ND	ND	0.5 J	ND	ND
Arsenic	1 J	8.3	9.3	ND	3.9	0.55 J	8.1	0.43 J	3.3
Barium	12.7	21.4	13.4	11.1	15.7	14.6	22.4	8.2	27.1
Beryllium	ND	0.19 J	0.16 J	0.13 J	0.24 J	0.26 J	0.26 J	ND	0.91
Calcium	235	172	1800	42.9 J	148	112 J	30.4 J	181	458
Chromium	13.2	20.8	19.3	9.3	22.6	15.9 J	23.3	9.3	11.3
Cobalt	0.14 J	0.47 J	0.46 J	1.1	0.32 J	0.67	0.71	0.32 J	6.8
Copper	1.8	3.6	3.9	1.8	4.2	3.2	3.5	0.85	6.7
Iron	3020	13300	14000	1450	5050	4100	12000 J	1420	8450
Lead	8.6 J	10.7 J	10.7 J	6.6 J	10 J	7.5 J	12.2 J	4.8 J	5.4
Magnesium	323	572	568	212	264	343	617	242	1250
Manganese	3.5	5.1 J	5.9 J	3.4 J	4.5	5.2	6.7	3	67.6
Mercury	ND	0.09	0.045	ND	0.044 J	ND	0.036 J	ND	0.059 J
Nickel	0.86	1.1	1.1	1.4	1.2	1.6	2	0.93	12.3
Potassium	303 J	565	518	275	869 J	644	784	269 J	668 J
Selenium	ND	0.51 J	0.59 J	ND	0.49 J	ND	1.3	ND	0.3 J
Silver	ND	0.15 J	0.19 J	ND	ND	ND	0.36 J	ND	0.1 J
Vanadium	9.3	31.9	32	9.7	24.2	13.6 J	39	8.8	11.1
Zinc	4.2	6.4	6.5	4.3	4.8	11.8	6.4	ND	39.7

Notes: ND - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant concentration is estimated

TABLE 6-6
STATISTICS SUMMARY FOR INORGANICS IN FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

	Distribution	Frequency of Detection	Range	Average Concentraion	2X Average Concentraion	Standard Deviation	2X Standard Deviation	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	2X Log Standard Deviation
METALS (mg/kg)										
Aluminum	Neither	39/39	29.4 - 8530	1951.28	3902.55	2059.15	4118.29	6.7	1.7	3.4
Antimony	Neither	14/39	ND - 0.9J	0.21	0.43	0.17	0.34	-1.76	0.63	1.26
Arsenic	Neither	12/39	ND - 0.85J	0.26	0.51	0.21	0.42	-1.59	0.62	1.24
Barium	Neither	35/39	ND - 24	5.80	11.60	5.48	10.96	1.21	1.26	2.52
Beryllium	Neither	24/39	ND - 0.11J	0.04	0.07	0.03	0.06	-3.73	1	2
Cadmium	Neither	4/39	ND - 0.11J	0.02	0.03	0.02	0.04	-4.37	0.56	1.12
Calcium	Neither	32/39	ND - 105000	3404.70	6809.40	16933.15	33866.31	4.77	1.98	3.96
Chromium	Lognormal	33/39	ND - 9.7	2.25	4.50	2.38	4.77	0.2	1.26	2.52
Cobalt	Neither	18/39	ND - 0.4J	0.12	0.23	0.10	0.20	-2.48	0.78	1.56
Copper	Lognormal	29/39	ND - 38.5	2.61	5.22	6.61	13.22	-0.1	1.31	2.62
Iron	Neither	39/39	26.3 - 5000	974.64	1949.29	1093.71	2187.42	6.14	1.45	2.9
Lead	Lognormal	39/39	0.45 - 38.5J	5.24	10.47	7.47	14.93	1.18	0.93	1.86
Magnesium	Lognormal	32/39	ND - 1610	105.78	211.57	258.15	516.30	3.64	1.41	2.82
Manganese	Lognormal	34/39	ND - 25.9	5.66	11.33	5.87	11.74	1.15	1.24	2.48
Mercury	Lognormal	19/39	ND - 0.12J	0.04	0.07	0.02	0.05	-3.48	0.59	1.18
Nickel	Neither	27/39	ND - 1.8	0.52	1.05	0.51	1.01	-1.28	1.28	2.56
Potassium	Lognormal	30/39	ND - 263J	44.58	89.15	56.19	112.38	3.17	1.21	2.42
Selenium	Neither	9/39	ND - 0.63	0.18	0.37	0.14	0.28	-1.87	0.54	1.08
Silver	Neither	1/39	ND - 0.11J	0.04	0.09	0.01	0.02	-3.13	0.17	0.34
Sodium	Neither	1/39	ND - 307	41.43	82.86	45.38	90.77	3.52	0.55	1.1
Thallium	Neither	0/39	ND	0.18	0.35	0.01	0.03	-1.74	0.07	0.14
Vanadium	Lognormal	37/39	0.14J - 13.4	3.00	5.99	3.09	6.18	0.56	1.15	2.3
Zinc	Lognormal	24/39	ND - 73.9	5.37	10.75	12.32	24.64	0.66	1.38	2.76

TABLE 6-7
STATISTICS SUMMARY FOR INORGANICS IN LOAMY SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

	Distribution	Frequency of Detection	Range	Average Concentraion	2X Average Concentraion	Standard Deviation	2X Standard Deviation	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	2X Log Standard Deviation
METALS (mg/kg)										
Aluminum	Lognormal	11/11	2040 - 17600J	5552.73	11105.45	4492.07	8984.14	8.41	0.65	1.31
Antimony	Normal	5/11	ND - 0.6J	0.25	0.51	0.17	0.35	-1.59	0.69	1.38
Arsenic	Normal	6/11	ND - 1.3J	0.52	1.03	0.41	0.83	-1.02	0.93	1.86
Barium	Normal	11/11	3.9 - 20	12.32	24.64	5.51	11.02	2.40	0.53	1.05
Beryllium	Lognormal	7/11	ND - 0.53J	0.11	0.21	0.14	0.29	-2.71	0.90	1.81
Cadmium	Neither	1/11	ND - 0.056J	0.02	0.03	0.01	0.03	-4.29	0.50	1.00
Calcium	Lognormal	10/11	ND - 11500	2383.03	4766.05	4053.82	8107.64	5.94	2.20	4.41
Chromium	Normal	11/11	2.3 - 12.6	5.78	11.56	3.23	6.46	1.62	0.56	1.11
Cobalt	Normal	9/11	ND - 0.51J	0.26	0.52	0.17	0.34	-1.66	0.93	1.86
Copper	Lognormal	10/11	ND - 5.8	1.73	3.46	1.49	2.97	0.26	0.82	1.64
Iron	Normal	11/11	251 - 12200J	3920.09	7840.18	3540.76	7081.51	7.86	1.06	2.13
Lead	Lognormal	11/11	3.2J - 26.8J	9.35	18.69	6.51	13.02	2.06	0.60	1.20
Magnesium	Normal	11/11	25.9J - 330	164.94	329.87	98.04	196.07	4.88	0.79	1.57
Manganese	Lognormal	11/11	0.81J - 49	11.15	22.29	14.74	29.47	1.74	1.23	2.45
Mercury	Normal	6/11	ND - 0.11	0.05	0.11	0.04	0.07	-3.19	0.80	1.61
Nickel	Normal	10/11	ND - 1.7	0.90	1.80	0.49	0.98	-0.26	0.60	1.21
Potassium	Normal	11/11	35.9J - 168J	105.99	211.98	47.57	95.13	4.55	0.54	1.08
Selenium	Lognormal	7/11	ND - 3.4	0.63	1.25	0.95	1.90	-1.08	1.07	2.14
Silver	Neither	3/11	ND - 1.1	0.16	0.32	0.32	0.63	-2.59	1.02	2.04
Sodium	Normal	0/11	ND	37.02	74.04	20.50	41.00	3.48	0.53	1.06
Thallium	Neither	0/11	ND	0.20	0.39	0.04	0.08	-1.65	0.18	0.36
Vanadium	Lognormal	11/11	3.3 - 26.2	9.60	19.20	6.86	13.72	2.06	0.64	1.29
Zinc	Lognormal	10/11	ND - 25.2	5.55	11.10	6.77	13.55	1.24	1.04	2.08

TABLE 6-8
STATISTICS SUMMARY FOR INORGANICS IN SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

	Distribution	Frequency of Detection	Range	Average Concentraion	2X Average Concentraion	Standard Deviation	2X Standard Deviation	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	2X Log Standard Deviation
METALS (mg/kg)										
Aluminum	Lognormal	29/29	260J - 9900	3608.24	7216.48	2732.39	5464.77	7.84	0.95	1.9
Antimony	Neither	11/29	ND - 0.41J	0.19	0.38	0.10	0.20	-1.8	0.51	1.02
Arsenic	Neither	6/29	ND - 1.4	0.29	0.58	0.33	0.67	-1.59	0.71	1.42
Barium	Lognormal	29/29	0.67J - 18.2	5.67	11.34	4.56	9.11	1.43	0.83	1.66
Beryllium	Neither	16/29	ND - 0.097J	0.03	0.07	0.03	0.05	-3.75	0.97	1.94
Cadmium	Neither	0/29	ND	0.01	0.02	0.00	0.00	-4.49	0.05	0.1
Calcium	Lognormal	19/29	ND - 499	58.19	116.39	92.04	184.08	3.49	1.02	2.04
Chromium	Lognormal	29/29	0.83 - 13.2	4.43	8.86	3.17	6.34	1.21	0.79	1.58
Cobalt	Neither	18/29	ND - 1.4	0.23	0.45	0.26	0.52	-2.02	1.04	2.08
Copper	Lognormal	15/29	ND - 3.3	0.76	1.52	0.89	1.77	-0.75	0.94	1.88
Iron	Lognormal	29/29	81.5 - 4600	1211.92	2423.83	1167.35	2334.69	6.65	1.05	2.1
Lead	Normal	29/29	1.1J - 6	2.88	5.77	1.32	2.64	0.96	0.46	0.92
Magnesium	Lognormal	29/29	13.5J - 216	93.84	187.68	66.80	133.61	4.25	0.83	1.66
Manganese	Lognormal	29/29	0.75J - 7.1	2.69	5.39	1.55	3.10	0.84	0.56	1.12
Mercury	Lognormal	19/29	ND - 0.061J	0.03	0.06	0.02	0.03	-3.59	0.53	1.06
Nickel	Lognormal	23/29	ND - 3.6	0.78	1.56	0.88	1.75	-0.87	1.25	2.5
Potassium	Lognormal	29/29	16J - 292	81.31	162.63	72.85	145.71	4.05	0.83	1.66
Selenium	Neither	11/29	ND - 0.47J	0.21	0.41	0.12	0.24	-1.72	0.52	1.04
Silver	Neither	1/29	ND - 0.1J	0.05	0.09	0.01	0.02	-3.08	0.16	0.32
Sodium	Normal	0/29	ND	35.41	70.82	11.97	23.93	3.5	0.38	0.76
Thallium	Neither	0/29	ND	0.18	0.37	0.01	0.02	-1.7	0.06	0.12
Vanadium	Lognormal	29/29	0.6J - 13.7	4.92	9.83	3.70	7.40	1.27	0.87	1.74
Zinc	Lognormal	12/29	ND - 7.9	1.54	3.08	1.82	3.64	-0.19	1.2	2.4

TABLE 6-9
STATISTICS SUMMARY FOR INORGANICS IN SUBSURFACE SILTS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

	Distribution	Frequency of Detection	Range	Average Concentraion	2X Average Concentraion	Standard Deviation	2X Standard Deviation	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	2X Log Standard Deviation
METALS (mg/kg)										
Aluminum	Lognormal	12/12	1450 - 16800	5724.17	11448.33	4155.89	8311.78	8.46	0.65	1.3
Antimony	Neither	1/12	ND - 0.47J	0.16	0.32	0.10	0.21	-1.95	0.43	0.86
Arsenic	Neither	5/12	ND - 3.2	0.80	1.60	1.10	2.21	-1.01	1.23	2.46
Barium	Normal	12/12	0.92J - 23.1	8.59	17.19	6.99	13.98	1.77	1	2
Beryllium	Lognormal	8/12	ND - 0.22J	0.07	0.15	0.06	0.13	-2.88	0.73	1.46
Cadmium	Normal	0/12	ND	0.01	0.02	0.00	0.00	-4.43	0.05	0.1
Calcium	Lognormal	8/12	ND - 4950	513.85	1027.71	1405.86	2811.71	4.17	1.98	3.96
Chromium	Lognormal	12/12	1.9 - 22.5	7.41	14.82	6.14	12.29	1.74	0.74	1.48
Cobalt	Normal	9/12	ND - 0.68	0.25	0.50	0.19	0.39	-1.72	0.93	1.86
Copper	Normal	8/12	ND - 3	1.03	2.05	0.95	1.91	-0.5	1.18	2.36
Iron	Lognormal	12/12	102 - 15600	3169.17	6338.33	4308.61	8617.22	7.36	1.33	2.66
Lead	Normal	12/12	1 - 8.7J	4.34	8.68	2.42	4.85	1.3	0.63	1.26
Magnesium	Normal	11/12	ND - 525	162.75	325.49	157.62	315.23	4.48	1.35	2.7
Manganese	Lognormal	12/12	0.57J - 17.2	4.01	8.02	4.60	9.20	0.92	1	2
Mercury	Lognormal	6/12	ND - 0.16J	0.04	0.09	0.04	0.08	-3.35	0.65	1.3
Nickel	Normal	11/12	ND - 2.8	0.96	1.93	0.81	1.61	-0.47	1.13	2.26
Potassium	Lognormal	11/12	ND - 546J	148.14	296.28	176.47	352.94	4.27	1.36	2.72
Selenium	Neither	5/12	ND - 0.77	0.25	0.49	0.19	0.38	-1.6	0.59	1.18
Silver	Neither	2/12	ND - 0.24J	0.07	0.14	0.06	0.12	-2.84	0.52	1.04
Sodium	Normal	0/12	ND	28.98	57.95	10.21	20.42	3.31	0.35	0.7
Thallium	Normal	0/12	ND	0.20	0.39	0.01	0.02	-1.63	0.05	0.1
Vanadium	Lognormal	12/12	0.35J - 33.9	9.00	18.01	9.24	18.49	1.7	1.18	2.36
Zinc	Lognormal	5/12	ND - 7.4	2.86	5.72	2.75	5.50	0.46	1.25	2.5

TABLE 6-10
STATISTICS SUMMARY FOR INORGANICS IN SUB-SURFACE CLAYS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

	Distribution	Frequency of Detection	Range	Average Concentraion	2X Average Concentraion	Standard Deviation	2X Standard Deviation	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	2X Log Standard Deviation
METALS (mg/kg)										
Aluminum	Normal	9/9	5290 - 15600J	9544.44	19088.89	3778.37	7556.73	9.1	0.39	0.78
Antimony	Neither	2/9	ND - 0.5J	0.18	0.36	0.13	0.26	-1.85	0.53	1.06
Arsenic	Normal	8/9	ND - 9.3	3.89	7.78	3.75	7.49	0.63	1.51	3.02
Barium	Normal	9/9	8.2 - 27.1	16.29	32.58	6.09	12.19	2.73	0.38	0.76
Beryllium	Lognormal	7/9	ND - 0.91	0.25	0.50	0.26	0.52	-1.76	0.91	1.82
Cadmium	Normal	0/9	ND	0.01	0.02	0.00	0.00	-4.41	0.05	0.1
Calcium	Lognormal	9/9	30.4J - 1800	353.26	706.51	556.94	1113.88	5.15	1.21	2.42
Chromium	Normal	9/9	9.3 - 23.3	16.11	32.22	5.59	11.19	2.72	0.37	0.74
Cobalt	Lognormal	9/9	0.14J - 6.8	1.22	2.44	2.11	4.22	-0.5	1.08	2.16
Copper	Normal	9/9	0.85 - 6.7	3.28	6.57	1.71	3.42	1.05	0.61	1.22
Iron	Normal	9/9	1420 - 14000	6976.67	13953.33	5071.73	10143.46	8.54	0.9	1.8
Lead	Normal	9/9	4.8J - 12.2J	8.50	17.00	2.59	5.17	2.09	0.33	0.66
Magnesium	Lognormal	9/9	212 - 1250	487.89	975.78	325.17	650.33	6.03	0.57	1.14
Manganese	Neither	9/9	3 - 67.6	11.66	23.31	21.01	42.03	1.81	0.94	1.88
Mercury	Normal	5/9	ND - 0.09	0.04	0.07	0.03	0.05	-3.52	0.73	1.46
Nickel	Neither	9/9	0.86 - 12.3	2.50	5.00	3.69	7.39	0.46	0.81	1.62
Potassium	Normal	9/9	269J - 869J	543.89	1087.78	222.43	444.85	6.21	0.46	0.92
Selenium	Lognormal	5/9	ND - 1.3	0.41	0.82	0.38	0.77	-1.24	0.88	1.76
Silver	Neither	4/9	ND - 0.36J	0.12	0.23	0.11	0.21	-2.46	0.78	1.56
Sodium	Normal	0/9	ND	37.08	74.16	15.22	30.43	3.55	0.38	0.76
Thallium	Neither	0/9	ND	0.20	0.40	0.01	0.02	-1.6	0.06	0.12
Vanadium	Normal	9/9	8.8 - 39	19.96	39.91	11.89	23.77	2.83	0.61	1.22
Zinc	Lognormal	8/9	ND - 39.7	9.52	19.03	11.65	23.30	1.85	0.88	1.76

APPENDIX A
SOIL ASSOCIATIONS

APPENDIX A
SOIL ASSOCIATIONS

Baymeade-Foreston-Stallings Association

The Baymeade-Foreston-Stallings soils occur on nearly flat lying or slightly sloped areas encompassing 28 percent of Onslow County. This association occurs primarily in the west and central portion of Onslow County. This soil association is comprised of 35 percent Baymeade (BaB, BmB) soils, 15 percent Foreston (Fo) soils, and 10 percent Stalling (St) soils. Forty percent of soils in this association are of lesser extent.

The surface soils at MCB, Camp Lejeune, located in the east central portion of Onslow County, are predominately the Baymeade-Foreston-Stallings association. This association is found on the uplands south of MCAS and Southwest Creek, and east of U.S. Route 17 near Verona between the west bank of the New River. The association then parallels the west bank of the New River down towards Sneads Ferry. The point of land south of Jacksonville where Tarrawa Terrace I and II are located is covered by the association. Mainside, the Naval Hospital, Paradise Point, the officer's quarters, HPIA, and the training areas south of U.S. Route 17 east of Jacksonville (west of State Route 172 between Hubert), Onslow Beach, and north of French Creek are lands covered by the Baymeade-Foreston-Stallings Association.

Baymeade soils are well drained fine sands underlain by fine sandy loam subsoil that are gently sloping or nearly level. Baymeade soils are moderately to highly acidic. Foreston soils are found on slightly convex divides, are well drained, strongly acidic, loamy fine sands with a fine sandy loam subsoil. Stallings soils are poorly drained, nearly level, strongly to extremely acidic, loamy fine sands over fine sandy loam in interstream areas. The minor soils that occur in this association are Murville (Mu), Marvyn (MaC), Torhunta (To), Woodington (Wo), Leon (Ln), Autryville (AuB) and Norfolk (NoA, NoB). The Baymeade, Foreston, Torhunta, Woodington and Stallings soils (St) were formed from similar sediments that had a high content of sand and low to moderate clay content.

Leon-Murville-Kureb Association

Leon-Murville-Kureb soils are present in the southern portion of Onslow County and in the southeast portion of MCB, Camp Lejeune. These soils occur in nearly flat interstream areas. This association,

consisting of 53 percent Leon (Ln) soils, 26 percent Murville (Mu) soils and 15 percent Kureb (KuB) soils, occupies 11 percent of Onslow County (SCS, 1992).

The Leon-Murville-Kureb association is located in areas of higher elevation north of S.R. 172 above the Courthouse Bay and Onslow Beach areas. This area is bounded on the north by French Creek and on the east by S.R. 172 as it turns north toward Hubert. There is also a thin finger of the Leon-Murville-Kureb association that is located east of U.S. Route 17 south of Verona and north of Stones Bay and Mill Creek.

Leon soils are nearly level soils found between wide interstream areas. Leon surface and subsoils are poorly drained, strongly to excessively acidic, and fine sandy loams. Murville soils surface and subsoil are strongly acidic, poorly drained and fine sandy loams which are found in interstream areas and depressions. The Kureb soils are found near drainages and undulating areas. Kureb soils are fine sands that are neutral to acidic and very well drained. Minor soils found in this association include St, Wo, Pactolus (Pa), Alpin (AnB), and Baymeade (BaB, BmB) soils. Leon, Murville and Kureb soils were formed from similar parent material that was predominately sand.

Muckalee-Dorovan Association

Muckalee-Dorovan soils occur over 10 percent of Onslow county in and along drainage channels. The Muckalee-Dorovan soils consist of 54 percent Muckalee (Mk) soils, 6 percent of Dorovan (Da) soils, and 40 percent soils of lesser extent (SCS, 1992).

Soils of the Muckalee-Dorovan Association can be found along most creeks at MCB, Camp Lejeune. This includes the shore of Northeast Creek north of the Naval Hospital, Wallace Creek, Stones Creek, French Creek, Harris Creek, Southeast Creek, Hicks Run, Cogduls Creek, Town Creek, Lewis Creek, Mill Creek, and Everett Creek. The north shore of Paradise Point is included in this association.

Muckalee soils are poorly drained, loam underlain by sandy loam and loam. The surface soils are strongly acidic and the subsoil can range from moderately acid to alkaline. Muckalee soils were formed from non-acidic parent material that was rich in calcium carbonate. Dorovan soils are muck that are very poorly drained and is strongly acidic. Dorovan soils have a high content of organic materials. Dorovan soils have formed by the accumulation of organic debris. The minor soils in this association are the Pactolus (Pa), Murville (Mu) and the Lafitte (La) muck.

Wando-Pactolus Association

Wando-Pactolus soils are found along the mainland adjacent to the coast. The association covers 3 percent of Onslow County. Wando-Pactolus soils are 53 percent Wando (Wo) soils, 39 percent Pactolus (Pa) soils and 7 percent other soils.

This association is located on the shores near Courthouse Bay, and along the intracoastal waterway and mainland bordering the waterway.

Wando soils are very well drained, gently sloping to nearly level, fine sands.. These soils are slightly to moderately acidic. Pactolus soils are located on uplands and stream terraces and are poorly drained to moderately well drained soils. These soils are moderately to strongly acidic fine sands. Leon (Ln), Murville (Mu), Kureb (KuB) and Alpin (AnB) soils are minor constituents of this association. Pactolus sands were formed from the same material that the Leon, Murville and Kureb soils were formed.

Norfolk-Goldsboro-Onslow Association

Norfolk-Goldsboro-Onslow association soils are located primarily in the northwestern portion of Onslow County. This association is 24 percent Norfolk (NoA, NoB), 19 percent Goldsboro (GoA) and 15 percent Onslow (On) soils. The remainder is soils of minor extent.

At MCB, Camp Lejeune, this association is found along the southeast shore of the New River between Duck Creek and the peninsula west of Courthouse Bay and between Southeast Creek, Edwards Creek and U.S. Route 17 near MCAS.

Norfolk soils are located adjacent to drainage ways and on slightly convex slopes. They are well drained, strongly acidic, loamy fine sands at the surface underlain by sandy clay loam. The moderately well drained Goldsboro soils are fine sandy loams with sandy clay loam subsoils that are strongly acidic. They are located on convex divides. Onslow soils are poorly drained loamy fine sands over a sublayer of humus coated sand that is weakly cemented. This is underlain by sandy clay loam. Onslow soils are strongly acidic. The Norfolk, Onslow and Goldsboro soils formed from clay

rich sediment that was low in silt and sand. Autryville, Lenoir (Le) loam, Lynchburg (Ly) fine sandy loam, Grifton (Gt) fine sandy loam, Marvyn (MaC), Muckalee (Mk), Rains (Ra), and Craven (Cr) soils are also included in this association.

Bohicket-Newhan Association

The Bohicket-Newhan association covers 3 percent of Onslow County on the barrier islands and tidal marshes between the mainland and islands. Bohicket-Newhan soils consist of 55 percent Bohicket (Bo) soils and 20 percent Newhan (NeE) soils. The remainder of the association are the minor soils types Carteret (Ca), Yaupon (YaA) sandy loam, Corolla (Co) sand and Duckston (Dc) muck.

Located in tidal marshes, the nearly level Bohicket soils are very poorly drained, silty clay loams underlain by silty clay and loamy sand. Bohicket soils are slightly acidic to alkaline. Bohicket soils are mineral rich soils that were formed from sediment that had a high content of clay and silt but were continuously flooded by tides. Newhan soils form dunes and are nearly level to steep. These very well drained, mildly alkaline sands are located on the barrier islands. Newhan soils formed from the same parent material as the Leon, Murville and Kureb soils.

Croatan Association

In the northeastern and south-central portions of Onslow County, Croatan Association soils occur in circular depressions and interstream areas. Croatan (CrB) soils cover 8 percent of Onslow County and consist of 75 percent Croatan soils and 25 percent of minor soils of lesser extent. These minor soils include Murville (Mu), Pantego (Pn) mucky loam, Torhunta (To), and Leon (Ln) types.

This association is not found at MCB, Camp Lejeune, however individual soil types from this association are scattered throughout the base and occur in other soil associations.

Croatan soils are very poorly drained mucks underlain by mucky sandy loam, sandy clay loam and sandy loam. The Croatan soils are extremely acidic and nearly level. This soil type formed from thick accumulations of organic material.

Rains-Woodington-Torhunta Association

Fourteen percent of the soils in Onslow County are classified in the Rains-Woodington-Torhunta Associations. This association is present in large interstream areas in the north and some small areas

in the western side of Onslow County. The association is 37 percent Rains (Ra), 30 percent Woodington (Wo), 28 percent Torhunta (To) and 5 percent Pantego, Croatan, Murville, Stallings and Lynchburg. This association is not found at MCB, Camp Lejeune, however individual soil types from this association are scattered throughout the base and occur in other soil associations.

Rains soils are strongly acidic, poorly drained, fine sandy loams at the surface underlain by a sandy clay loam subsoil. Rains soils are found in smooth, broad interstream areas. Woodington soils, also found in smooth, broad interstream areas, are strongly to extremely acidic, loamy fine sands underlain by fine sandy loams. Woodington soils are poorly drained. The very poorly drained, fine sandy loam, Torhunta soils occur in wide interstream areas. Torhunta soils are also strongly to extremely acidic. The major soils in this association formed from parent material that was rich in sand with low to moderate amounts of clay.

APPENDIX B
TEST BORING CONSTRUCTION RECORDS

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG01
COORDINATES: EAST: 2462237.504 NORTH: 359952.604
ELEVATION SURFACE:

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/11/00	6	Sunny 75	5.5
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1 50%	**SILTY SAND**, fine, dk brown, dry. **BASE-BG01-00 collected at 0.0-1.0 ft, bgs**	
1.8				
2 2.0			**SAND**, v fine, lt grey, trace silt, dry. 2.0	
3	S-2	2 100%	**SAND**, fine, dk grey and black, some silt, dry. **BASE-BG01-02 collected at 3.5-5.5 ft, bgs**	
4 4.0				
5	S-3	1.9 95%	Note: silt content decreasing, wet at 5.5'.	
6 6.0			6.0	
7			End of Boring at 6.0'	
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG01 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG02
COORDINATES: EAST: 2479769.658 NORTH: 364124.576
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/13/00	8	Sunny 80	7.9
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL = mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.2 60%	**SAND**, fine, lt brown, trace to no silt, dry. Note: damp at 1.6'. **BASE-BG02-00 collected at 0.0-1.0 ft, bgs**	
2 2.0			2.0	
3	S-2	1.5 75%	**SAND**, fine, brown and grey mottled, little silt, trace clay, damp. Note: iron staining.	
4 4.0			3.8	
5	S-3	1.1 55%	**SAND**, fine, lt grey, trace silt, trace clay, damp. Note: iron staining.	
6 6.0			5.5 **SAND**, fine, brown and grey, trace silt, trace clay, damp.	
7	S-4	1.2 60%	**BASE-BG02-03 collected at 7.5-7.9 ft, bgs** 7.5	
8 8.0			**CLAY**, grey, trace silt, with med sand pockets. Wet at 7.9'. 8.0	
9			End of Boring at 8.0'	
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG02 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG03
COORDINATES: EAST: 2481966.334 NORTH: 363359.009
ELEVATION SURFACE:

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/13/00	6	Sunny 80	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS

med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL = mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1 – 2.0	S-1	1 50%	SAND, fine, lt brown, trace silt, trace roots, dry. **BASE-BG03-00 collected at 0.0-1.0 ft, bgs**	
3 – 4.0	S-2	1.5 75%	3.0	
5 – 6.0	S-3	1 50%	CLAY, brown and grey mottled, some silt, trace sand, damp. Note: iron staining and root/organic material present. **BASE-BG03-02 collected at 4.0-6.0 ft, bgs** 6.0	
7 – 10			End of Boring at 6.0'	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG03 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG04
COORDINATES: EAST: 2469063.026 NORTH: 359364.058
ELEVATION SURFACE:

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/11/00	6	Sunny 75	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1 – 2 (2.0)	S-1	1.4 70%	SAND, fine, dk brown, little silt, dry. **BASE-BG04-00 collected at 0.0-1.0 ft, bgs**	
3 – 4 (4.0)	S-2	0.8 40%	SAND, fine, grey and lt brown, trace-little silt, moist. **BASE-BG04-02 collected at 3.5-5.5 ft, bgs**	
5 – 6 (6.0)	S-3	2 100%	SAND, fine, lt grey, trace silt, wet.	
7 – 10			End of Boring at 6.0'	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG04 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG05
COORDINATES: EAST: 2476054.307 NORTH: 357208.711
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.5"				7/13/00	6	Sunny 80	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS

med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1 50%	**SAND**, fine, lt brown, trace silt, trace roots, dry. **BASE-BG05-00 collected at 0.0-1.0 ft, bgs**	
2 2.0			2.0	
			SAND, fine, brown, trace silt, dry. 2.1	
3	S-2	1 50%	**SILTY CLAY**, brown, trace fine sand, damp. 3.8	
4 4.0			**CLAY**, brown and grey, little silt, trace fine sand, damp.	
5	S-3	1.8 90%	**BASE-BG05-02 collected at 4.0-6.0 ft, bgs**	
6 6.0			6.0	
7			End of Boring at 6.0'	
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG05 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background
PROJ. NO.: 62470-371 BORING NO.: BASE-BG06
COORDINATES: EAST: 2487311.381 NORTH: 361943.952
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.5"				7/13/00	10	Sunny 80	9.7
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1 – 2.0	S-1	1 50%	**SILTY SAND**, fine, lt brown, gravel intermixed in top 0.5', dry. **BASE-BG06-00 collected at 0.0-1.0 ft, bgs**	
			1.8	
2 – 4.0	S-2	1 50%	**SILT**, fine, brown, trace fine sand, dry.	
			4.5	
5 – 6.0	S-3	1.8 90%	**SAND**, fine, lt brown and grey, little silt, dry.	
			7.0	
7 – 8.0	S-4	1.6 80%	**SAND**, fine, lt brown and grey, dry. Note: no silt, iron staining.	
9 – 10.0	S-5	1.7 85%	**BASE-BG06-04 collected at 9.0-10.0 ft, bgs** Note: wet at 9.7'.	
			10.0	
			End of Boring at 10.0'	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG06 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG07
COORDINATES: EAST: 2491127.672 NORTH: 363809.115
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe								
	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.5"				7/13/00	8	Sunny 80	8
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light NA= non-applicable
dk = dark MSL= mean sea level
NA= not applicable/not available

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1		S-1	1.2 60%	**SAND**, fine, dk grey, some silt, dry. **BASE-BG07-00 collected at 0.0-1.0 ft, bgs**	
2	2.0			2.0	
3		S-2	2 100%	**SAND**, fine, grey, iron stained, trace-little silt, trace roots, dry-damp. Note: iron staining.	
4	4.0				
5		S-3	1 50%		
6	6.0			6.0	
7		S-4	0.7 35%	**BASE-BG07-03 and -03-DUP collected at 5.0-7.0 ft, bgs** **CLAYEY SAND**, fine, lt grey, trace silt, moist to wet at 8.0'.	
8	8.0			8.0	
9				End of Boring at 8.0'	
10					

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG07 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG08
COORDINATES: EAST: 2488712.248 NORTH: 356993.673
ELEVATION SURFACE: NA

Rig: Ingersol-Rand Truck Mount								
	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	12	Partly Cloudy 75	11
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description		Elevation (Ft. MSL)
1		S-1	2 100%	SAND, fine, trace silt, grass roots (topsoil).	0.2	
				BASE-BG08-00 COLLECTED AT 0.0-1.0 ft, bgs		
2	2.0			SAND, fine, yellowish brown, trace silt, damp.		
3		S-2	1.3 65%			
4	4.0				4.0	
5		S-3	1.9 95%	CLAY, yellowish brown, little fine sand, semi-plastic, damp.		
6	6.0					
7		S-4	2 100%		7.6	
8	8.0					
9		S-5	2 100%	SAND, fine, lt grey, trace silt, moist. Note: orange staining layers at 8.0'.		
10	10.0					
				Match to Sheet 2		

DRILLING COMPANY Parratt-Wolff BAKER REP.: David Schilling
DRILLER: Arnie Chapel and Jesse Kaulferf BORING NO.: BASE-BG08 SHEET 1 OF 2

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
CTO NO.: 62470-371 BORING NO.: BASE-BG08

SAMPLE TYPE		DEFINITIONS	
S = Split Spoon	A = Auger	med = medium	ft or ' = feet
T = Shelby Tube	W = Wash	v = very	bgs = below ground surface
R = Air Rotary	C = Core	lt = light	MSL= mean sea level
D = Denison	P = Piston N = No Sample	dk = dark	

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
10			Match to Sheet 1	
11	S-6	1.7 85%	**BASE-BG08-05 COLLECTED AT 10.0-11.0 ft, bgs**	10.7
12 12.0			**SAND**, fine, grey, semi-plastic, wet.	
13			End of Boring at 12.0'	
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				

DRILLING COMPANY: Parratt-Wolff BAKER REP.: David Schilling
DRILLER: Arnie Chapel and Jesse Kaulferf BORING NO.: BASE-BG08 SHEET 2 OF 2

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG09
COORDINATES: EAST: 2501634.939 NORTH: 354858.386
ELEVATION SURFACE: NA

Rig: CME-35 Truck Mount	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/14/00	12	Sunny 85	11.9
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.5 75%	SAND, fine, grey, trace silt, dry. Note: color change to lt brown and trace gravel at 1.6'. **BASE-BG09-00 COLLECTED AT 0.0-1.0 ft, bgs**	
2 2.0				
3	S-2	1.3 65%	3.4	
4 4.0			SAND, fine, brownish red, little silt, trace roots, damp. 4.0	
5	S-3	1.6 80%	SAND, fine, lt grey and tan, trace silt, damp.	
6 6.0				
7	S-4	1.6 80%	Same, except, trace to no silt at 6.0'.	
8 8.0				
9	S-5	1.3 65%		
10 10.0			Same, except, trace clay at 9.3'.	
			Match to Sheet 2	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG09 SHEET 1 OF 2

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
CTO NO.: 62470-371 BORING NO.: BASE-BG09

SAMPLE TYPE	DEFINITIONS	
S = Split Spoon A = Auger	med = medium	ft or ' = feet
T = Shelby Tube W = Wash	v = very	bgs = below ground surface
R = Air Rotary C = Core	lt = light	MSL= mean sea level
D = Denison P = Piston N = No Sample	dk = dark	

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
10			Match to Sheet 1 10.0	
11	S-6	1.6 80%	**BASE-BG09-05 COLLECTED AT 10.0-12.0 ft, bgs** Same, except wet at 11.9'	
12 12.0			12.0	
			End of Boring at 12.0'	
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				

DRILLING COMPANY: Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG09 SHEET 2 OF 2

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG10
COORDINATES: EAST: 2482035.305 NORTH: 354071.768
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/13/00	6	Sunny 80	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.3 65%	SAND, fine, grey, trace silt, little roots, dry.	
			BASE-BG10-00 collected at 0.0-1.0 ft, bgs 1.0	
2 2.0			SAND, fine, brown, little-some silt, dry. 2.0	
3	S-2	1.7 85%	SAND, brown, little silt, damp.	
4 4.0				
5	S-3	1.8 90%	5.0	
			SAND, fine, white, no silt, damp.	
6 6.0			**BASE-BG10-02 collected at 5.0-6.0 ft, bgs** 6.0	
7			End of Boring at 6.0'	
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG10 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG11
COORDINATES: EAST: 2458611.130 NORTH: 349321.815
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/11/00	8	Sunny 75	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1 – 2 (2.0)	S-1	1.4 70%	SAND, fine, lt brown, trace silt, dry. **BASE-BG11-00 collected at 0.0-1.0 ft, bgs**	
3 – 4 (4.0)	S-2	1.8 90%	Note: trace-little silt.	
5 – 6 (6.0)	S-3	1.4 70%	Note: lt brown-grey at 4.0'. 5.8 CLAY, grey, little, fine, sand stringers, some silt, damp. **BASE-BG11-03 collected at 5.0-7.0 ft, bgs**	
7 – 8 (8.0)	S-4	1.3 65%	Note: moist at 6.0-8.0'. 8.0	
9 – 10			End of Boring at 8.0'	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG11 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG12
COORDINATES: EAST: 2463291.244 NORTH: 351910.395
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.5"				7/11/00	10	Sunny 75	9.7
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.8 90%	**SAND**, fine, lt grey, trace silt, dry. 0.7	
2 2.0			**SILT**, fine, brown, little to some very fine sand, dry. Note: silt content decreasing. **BASE-BG12-00 collected at 0.0-1.0 ft, bgs** 2.5	
3	S-2	1.5 75%	**SAND**, lt brown turning grey, some silt, dry. Note: silt content decreasing. 3.5	
4 4.0			**SAND**, fine, lt grey, trace silt, dry.	
5	S-3	2 100%	**SAND**, very fine, lt grey-white, trace silt, moist-damp.	
6 6.0				
7	S-4	1.7 85%		
8 8.0				
9	S-5	1.6 80%	**BASE-BG12-04 collected at 8.7-9.7 ft, bgs** Note: wet at 9.7'.	
10 10.0			10.0	
			End of Boring at 10.0'	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG12 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune BASE Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG13
COORDINATES: EAST: 2460326.590 NORTH: 343563.813
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/11/00	8	Sunny 85	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.7 85%	SAND, fine, dk brown, trace-little silt, dry. 0.5 SAND, fine, reddish brown, little-some silt, dry.	
2 2.0			**BASE-BG13-00collected at 0.0-1.0 ft, bgs** 2.0	
3	S-2	1 50%	SILTY SAND, brown and grey, trace-little clay, damp. Note: clay content increasing with depth.	
4 4.0			4.0	
5	S-3	1.6 80%	CLAYEY SILT, trace sand, damp. 5.5	
6 6.0			CLAY, brown and grey, trace-little silt, trace sand, moist-wet..	
7	S-4	1 50%	**BASE-BG13-03 collected at 5.0-7.0 ft, bgs** Note: moist at 6.0-8.0'.	
8 8.0			8.0	
9			End of Boring at 8.0'	
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG13 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG14
COORDINATES: EAST: 2466021.828 NORTH: 349952.637
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe								
	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/12/00	4	Cloudy 75	3.8
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.2 60%	SAND, fine, dk brown, little silt, trace roots, dry.	
2 2.0			**BASE-BG14-00 collected at 0.0-1.0 ft, bgs**	
3	S-2	1 50%	**BASE-BG14-01 collected at 3.0-4.0 ft, bgs**	
4 4.0			Wet at 3.8'. 4.0	
5			End of Boring at 4.0'	
6				
7				
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG14 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG15
COORDINATES: EAST: 2493167.954 NORTH: 351762.190
ELEVATION SURFACE: NA

Rig: Ingersol-Rand Truck Mount	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	12	Partly Cloudy 75	9
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	0.9 45%	SAND, fine, trace silt, grass roots (topsoil). 0.2	
2 2.0			**BASE-BG15-00 COLLECTED AT 0.0-1.0 ft, bgs**	
			SAND, fine, dk greyish brown, trace silt, damp.	
3	S-2	1.3 65%		
4 4.0			4.0	
5	S-3	0.7 35%	CLAY, grey with orange mottling, trace fine sand, semi-plastic, damp.	
6 6.0			**BASE-BG15-03 COLLECTED AT 5.0-6.0 ft, bgs**	
			7.1	
7	S-4	2 100%	CLAY, and SAND, fine, grey, semi-plastic, damp.	
8 8.0			8.0	
9	S-5	2 100%	CLAY, grey with orange mottling, some fine sand, semi-plastic, moist.	
10 10.0			**BASE-BG15-06 COLLECTED AT 8.0-9.0 ft, bgs**	
			10.0	
			Match to Sheet 2	

DRILLING COMPANY Parratt-Wolff BAKER REP.: David Schilling
DRILLER: Arnie Chapel and Jesse Kaulferf BORING NO.: BASE-BG15 SHEET 1 OF 2

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
CTO NO.: 62470-371 BORING NO.: BASE-BG15

SAMPLE TYPE	DEFINITIONS	
S = Split Spoon A = Auger	med = medium	ft or ' = feet
T = Shelby Tube W = Wash	v = very	bgs = below ground surface
R = Air Rotary C = Core	lt = light	MSL= mean sea level
D = Denison P = Piston N = No Sample	dk = dark	

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
10			Match to Sheet 1	
11	S-6	2 100%	**CLAY**, interbedded sand layers, blueish grey, plastic, wet.	
12 12.0			12.0	
			End of Boring at 12.0'	
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				

DRILLING COMPANY: Parratt-Wolff BAKER REP.: David Schilling
DRILLER: Arnie Chapel and Jesse Kaulferf BORING NO.: BASE-BG15 SHEET 2 OF 2

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG16
COORDINATES: EAST: 2489753.293 NORTH: 345423.123
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/13/00	8	Sunny 80	8
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.3 65%	**SAND**, fine,lt brown, some silt, dry. **BASE-BG16-00 collected at 0.0-1.0 ft, bgs**	
2 (2.0)			1.8 **SILT**, fine, reddish brown, trace sand, trace clay, dry-damp. 2.0	
3	S-2	1.2 60%	**SAND**, fine, trace silt, damp.	
4 (4.0)			4.0	
5	S-3	2 100%	**SAND**, fine, white-brown, damp.	
6 (6.0)			Note: med and fine grained at 5.7' becoming more brown in color.F60	
7	S-4	1.5 75%	**BASE-BG16-03 collected at 7.0-8.0 ft, bgs**	
8 (8.0)			Wet at 8.0'. 8.0	
9			End of Boring at 8.0'	
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG16 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG17
COORDINATES: EAST: 2493294.734 NORTH: 345170.674
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/13/00	10	Sunny 80	9.9
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.2 60%	**SAND**, fine, lt brown, trace to no silt, dry. **BASE-BG17-00 collected at 0.0-1.0 ft, bgs**	
2 2.0			2.0	
3	S-2	1.4 70%	**SAND**, fine, lt brown, trace silt, damp.	
4 4.0				
5	S-3	1.8 90%	Note: color change to white.	
6 6.0				
7	S-4	1.3 65%	**BASE-BG17-04, -04-DUP, -04-MS/MSD collected at 7.0-9.0 ft, bgs** 7.5	
8 8.0			**CLAY**, fine, lt grey with iron staining, trace fine sand, little silt, damp-moist.	
9	S-5	1.1 55%	9.0	
10 10.0			**SAND**, fine, lt grey, trace silt, moist to wet at 9.9'. 10.0	
			End of Boring at 10.0'	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG17 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG18
COORDINATES: EAST: 2504053.122 NORTH: 350332.206
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/14/00	6	Sunny 80	5
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.6 80%	SAND, fine, grey, trace silt, little roots, dry.	
			BASE-BG18-00 collected at 00-1.0 ft, bgs 1.0	
2			SAND, fine, brown, iron staining prevalent, trace to no silt, dry.	
3	S-2	1.9 95%	Note: no iron staining and tan in color at 2.0'.	
4				
5	S-3	1 50%	**BASE-BG18-02, -02-DUP and -02-MS/MSD collected at 3.0-5.0 ft, bgs**	
6			Wet at 5.0'. 6.0	
7			End of Boring at 6.0'	
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG18 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG19
COORDINATES: EAST: 2503007.750 NORTH: 342108.143
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe								
	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/14/00	8	Sunny 85	8
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.5 75%	SILT, grey, little fine sand, trace gravel, dry.	
			BASE-BG19-0 collected at 0.0-1.0 ft, bgs 1.0	
2			SILT, fine, brown, trace fine sand, dry.	
3	S-2	1.8 90%	Note: brown and tan with iron staining at 2.0'	
4				
5	S-3	1 50%	5.0	
6			CLAY, lt grey, little silt, trace fine sand, damp. 5.5	
7	S-4	1.3 65%	SAND, fine to v fine, white, no silt, damp.	
			6.7 **BASE-BG19-03 collected at 7.0-8.0 ft, bgs**	
8			SAND, fine, tan and grey, trace silt, moist to wet at 8.0'. 8.0	
9			End of Boring at 8.0'	
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG19 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG20
COORDINATES: EAST: 2519657.520 NORTH: 353053.611
ELEVATION SURFACE: NA

Rig: CME-35 Truck Mount	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	8	Sunny 85	3.5
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.6 80%	**SAND**, fine, lt brown becoming mottled with lt grey, trace silt, trace, organics (roots) dry.	
2 2.0			**BASE-BG20-00 collected at 0.0-1.0 ft, bgs** Same except lt grey mottled with dk brown	
			BASE-BG20-01 collected at 2.0-3.0 ft, bgs 2.6	
3	S-2	1.3 65%	**SAND**, fine, grey-brown, little-some clay, trace organics (roots), moist. 3.4	
4 4.0			**SAND**, fine, brown, some silt, trace clay, some organics (roots), wet at 3.5'. 4.0	
5	S-3	2 100%	**PEAT**, black-brown, some fine sand, wet. 5.2	
6 6.0				
7	S-4	2 100%	**SAND**, fine, lt grey mottled with orange-yellow becoming yellow-brown, wet.	
8 8.0			8.0	
9			End of Boring at 8.0'	
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: Nathanael Barta
DRILLER: Louis Lefever and Justin Abreu BORING NO.: BASE-BG20 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG21
COORDINATES: EAST: 2514315.169 NORTH: 337605.836
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/15/00	6	Sunny 80	5
Length	2.0'						storm	
Type	Stainless						approaching	
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
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R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.4 70%	SAND, fine, grey, trace silt, dry. **BASE-BG21-00 collected at 0.0-1.0 ft, bgs**	
1.8				
2 2.0			SILTY SAND, fine, brown, damp. 2.0	
3	S-2	1.8 90%	SAND, fine, lt brown, little to trace silt, damp.	
3.8				
4 4.0			CLAY, lt grey, some sand, trace silt, damp to moist. 4.0	
5	S-3	1 50%	SAND, fine, lt grey, trace silt, trace clay, moist. **BASE-BG21-02 collected at 4.0-5.0 ft, bgs** 5.0	
6 6.0			SAND, fine, lt brown,trace silt, wet at 5.0'. 6.0	
7			End of Boring at 6.0'	
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG21 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG22
COORDINATES: EAST: 2499714.837 NORTH: 342147.125
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/14/00	10	Sunny 85	9.8
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.5 75%	SAND, fine, grey, dry.	
			BASE-BG22-00 collected at 0.0-1.0 ft, bgs 1.0	
2 2.0			SAND, fine, brown, little silt, dry.	
3	S-2	1.6 80%	Note: tree roots and iron staining at 2.0'	
4 4.0				
			4.5	
5	S-3	1 50%	SILT, grey, little clay, trace sand, damp.	
6 6.0				
7	S-4	1.3 65%		
			7.8	
8 8.0			SAND, fine, white, damp to wet at 9.8'.	
9	S-5	1.2 60%	**BASE-BG22-04 collected at 8.5-9.5 ft, bgs**	
10 10.0			Wet at 9.8'. 10.0	
			End of Boring at 10.0'	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG22 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG23
COORDINATES: EAST: 2460513.902 NORTH: 341789.258
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/11/00	6	Sunny 75	4.8
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1		S-1	1.4 70%	**SAND**, fine, dk brown, trace silt, trace to little roots, dry. 0.5	
2	2.0			**BASE-BG23-00 collected at 0.0-1.0 ft, bgs** SAND, fine, brown, trace silt, dry.	
3		S-2	0.9 45%	**BASE-BG23-01 collected at 1.0-3.0 ft, bgs** Note: Wet at 3.5', color changes to grey.	
4	4.0			4.8	
5		S-3	2 100%	**SILT**, grey, little fine sand, trace clay, wet.	
6	6.0			6.0	
7				End of Boring at 6.0'	
8					
9					
10					

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG23 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG24
COORDINATES: EAST: 2471163.182 NORTH: 337823.832
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/12/00	4	Cloudy 75	3
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1		S-1	1 50%	SILT, fine, dk brown, little fine sand, some roots, dry. 0.5	
				BASE-BG24-00 collected at 0.0-1.0 ft, bgs	
2	2.0			SAND, fine, lt grey, trace to no silt, damp. 2.0	
				BASE-BG24-01 collected at 2.0-3.0 ft, bgs	
3		S-2	2 100%	SAND, fine dk brown, little silt, moist to wet at 3.0'.	
4	4.0			4.0	
5				End of Boring at 4.0'	
6					
7					
8					
9					
10					

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG24 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG25
COORDINATES: EAST: 2496298.395 NORTH: 333823.581
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/14/00	4	Cloudy 75	4.1
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.1 55%	SAND, fine, grey, trace silt, little roots, dry. **BASE-BG25-00 collected at 0.0-1.0 ft, bgs**	
2 2.0			2.0	
3	S-2	1.3 65%	SAND, fine, brown, damp. **BASE-BG25-01 collected at 3.0-4.0 ft, bgs**	
4 4.0			Wet at 4.1'. 4.0	
5			End of Boring at 4.0'	
6				
7				
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG25 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG26
COORDINATES: EAST: 2504445.691 NORTH: 335468.524
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/14/00	6	Sunny 85	5.8
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL = mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1 50%	SAND, fine, lt grey, trace to no silt, trace roots, dry. **BASE-BG26-00 collected at 0.0-1.0 ft, bgs**	
2 2.0			1.8	
3	S-2	1.5 75%	SILT, brown, trace sand, dry.	
4 4.0			3.0 SAND, fine, lt brown, trace silt, damp.	
5	S-3	1 50%	Note: color change to lt grey and tan. **BASE-BG26-02 collected at 5.0-5.8 ft, bgs**	
6 6.0			Wet at 5.8'. 6.0	
7			End of Boring at 6.0'	
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG26 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG27
COORDINATES: EAST: 2506284.648 NORTH: 335649.456
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/14/00	12	Sunny 85	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1 – 2.0	S-1	1 / 50%	**SAND**, fine, lt grey, trace silt, trace roots, dry. Note: color change to brown at 1.8'. **BASE-BG27-00 COLLECTED AT 0.0-1.0 ft, bgs**	
2.0 – 4.0	S-2	1.1 / 55%		
4.0 – 6.0	S-3	1.4 / 70%	Same, except iron staining at 4.0-6.0'.	
6.0 – 8.0	S-4	1.3 / 65%	Same, except damp.	
8.0 – 10.0	S-5	1.6 / 80%	Same, except damp-moist at 8.0'. **BASE-BG27-05 COLLECTED AT 9.0-10.0 ft, bgs**	

Match to Sheet 2

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG27 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study

CTO NO.: 62470-371 BORING NO.: BASE-BG27

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

med = medium
v = very
lt = light
dk = dark
ft or ' = feet
bgs = below ground surface

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
10				Match to Sheet 1 10.0	
11		S-6	1.2 60%	Same	
12	12.0			12.0	
				End of Boring at 12.0'	
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					

DRILLING COMPANY: Parratt-Wolff BAKER REP.: James S. Culp

DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG27 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG28
COORDINATES: EAST: 2530615.501 NORTH: 334539.505
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/15/00	6	Partly Sunny 85	5
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS

med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.2 60%	SILT, brown, trace sand, trace to little roots, damp. 0.5	
2			**BASE-BG28-00 collected at 0.0-1.0 ft, bgs**	
2.0			SAND, fine, lt brown to brown, trace silt, dry.	
3	S-2	1 50%	3.0	
4			SILT, brown, trace sand, trace to little clay, damp.	
4.0			**BASE-BG28-02 collected at 3.0-3.0 ft, bgs** 4.0	
5	S-3	1 50%	SILT and SAND, fine, brown, damp-moist.	
6			6.0	
6.0			End of Boring at 6.0'	
7				
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG28 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG29
COORDINATES: EAST: 2464953.434 NORTH: 333244.877
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/12/00	6	Sunny 75	6
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1 – 2	S-1	1.3 65%	SAND, fine, brown, little silt, dry. 0.5 **BASE-BG29-00 collected at 0.0-1.0 ft, bgs** SAND, fine, lt brown, trace silt, dry.	
3 – 4	S-2	1.6 80%	3.3 SILT, grey and brown, trace fine sand, trace clay, damp-moist.	
5 – 6	S-3	1.8 90%	**BASE-BG29-02 collected at 4.5-6.0 ft, bgs** Wet at 6.0' 6.0	
7 – 10			End of Boring at 6.0'	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG29 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG30
COORDINATES: EAST: 2473907.939 NORTH: 331039.796
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/12/00	4	Cloudy 75	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.4 70%	SAND, fine, black and grey, dry. 0.7 **BASE-BG30-00 collected at 0.0-1.0 ft, bgs** SAND, fine, grey, dry-damp.	
2 2.0			2.0	
3	S-2	1.1 55%	**BASE-BG30-02 collected at 3.0-4.0 ft, bgs** SAND, dk brown, trace silt, moist to wet. Note: organic rich silt.	
4 4.0			Wet at 4.0'. 4.0	
5			End of Boring at 4.0'	
6				
7				
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG30 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG31
COORDINATES: EAST: 2505302.351 NORTH: 324194.941
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	10	Sunny 85	9.7
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1 – 2.0	S-1	1.7 85%	**SAND**, fine, lt brown, trace silt, iron staining and nodules, trace roots, dry. **BASE-BG31-00 collected at 0.0-1.0 ft, bgs**	
3 – 4.0	S-2	1.8 90%	Note: silt content increasing.	
5 – 6.0	S-3	1.2 60%	Note: little silt, trace clay.	
7 – 8.0	S-4	1.1 55%	7.0 **SAND**, fine, white, dry. 8.0	
9 – 10.0	S-5	1.8 90%	**SAND**, fine, brown, trace silt, moist to wet at 9.7'. **BASE-BG31-04 collected at 8.5-9.5 ft, bgs** 10.0	
			End of Boring at 10.0'	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG31 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG32
COORDINATES: EAST: 2531300.585 NORTH: 326026.705
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/15/00	8	Rain 85	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1 – 2 (2.0)	S-1	1.2 60%	**SAND**, fine, brown, trace silt, damp. **BASE-BG32-00 collected at 0.0-1.0 ft, bgs**	
			2.5	
3 – 4 (4.0)	S-2	1.8 90%	**SAND**, fine, reddish-brown, trace silt, damp.	
			5.3	
5 – 6 (6.0)	S-3	1.8 90%	**SAND**, fine, brown, trace silt, damp. 5.8 **SAND**, fine, dk brown, little silt, damp to moist. **BASE-BG32-03 collected at 6.0-7.0 ft, bgs**	
7 – 8 (8.0)	S-4	1.9 95%	Note: moist at 6.0-8.0'. 7.5 **SAND**, fine, lt brown, trace silt, moist.	
			8.0	
9 – 10			End of Boring at 8.0'	

DRILLING COMPANY Parratt-Wolff
DRILLER: Brian Waters and Jim Wheelin

BAKER REP.: James S. Culp
BORING NO.: BASE-BG32 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG33
COORDINATES: EAST: 2511793.175 NORTH: 324794.582
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/14/00	8	Sunny 85	7.1
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1 – 2 (2.0)	S-1	1.7 85%	**SAND**, fine, lt grey-white, trace to no silt, dry. **BASE-BG33-00 collected at 0.0-1.0 ft, bgs**	
3 – 4 (4.0)	S-2	1 50%	Note: color change at 2.2'.	
5 – 6 (6.0)	S-3	1.6 80%	Note: moist at 4.0 to 6.0'. **BASE-BG33-02, -02-DUP and -02-MS/MSD collected at 4.0-6.0 ft, bgs**	
7 – 8 (8.0)	S-4	1 50%	Note: wet at 6.0 to 8.0'.	
9 – 10			End of Boring at 8.0'	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG33 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG34
COORDINATES: EAST: 2520522.097 NORTH: 314150.609
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/15/00	8	Sunny 80	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1 – 2 (2.0)	S-1	1.3 65%	SAND, fine, lt brown, trace silt, dry-damp. **BASE-BG34-00 collected at 0.0-1.0 ft, bgs**	
3 – 4 (4.0)	S-2	1.8 90%		
5 – 6 (6.0)	S-3	1.5 75%	Note: lt brown to grey at 4.0'.	
7 – 8 (8.0)	S-4	1.3 65%	**BASE-BG34-03 collected at 7.0-8.0 ft, bgs** Note: moist at 6.0-8.0'.	
			8.0	
9 – 10			End of Boring at 8.0'	

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG34 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG35
COORDINATES: EAST: 2524201.886 NORTH: 311513.576
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	4	Sunny 85	3.9
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	2 100%	SAND, fine, brown, iron staining, trace silt, trace roots, damp.	
2 2.0			**BASE-BG35-00 collected at 0.0-1.0 ft, bgs**	
3	S-2	1.8 90%	**BASE-BG35-01 collected at 2.0-3.0 ft, bgs**	
4 4.0			Note: wet at 3.9'	
5			End of Boring at 4.0' 4.0	
6				
7				
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG35 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG36
COORDINATES: EAST: 2517843.470 NORTH: 312906.158
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/15/00	6	Sunny 80	3.8
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1 50%	SAND, fine, lt grey, trace silt, dry. BASE-BG36-00 collected at 0.0-1.0 ft, bgs	
2			1.8 BASE-BG36-01 collected at 2.0-3.0 ft, bgs	
3	S-2	1 50%	SAND, fine, lt brown, trace silt, damp.	
4			Wet at 3.8'.	
5	S-3	1.5 75%		
6			6.0	
7			End of Boring at 6.0'	
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG36 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG37
COORDINATES: EAST: 2504577.387 NORTH: 317942.180
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	4	Sunny 85	2.5
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.1 55%	SAND, fine, black and grey, trace silt, dry. **BASE-BG37-00 collected at 0.0-1.0 ft, bgs**	
2			1.9 SAND, fine, reddish brown, trace silt. **BASE-BG37-01 collected at 2.0-2.5 ft, bgs**	
3	S-2	1.6 80%		
4			SAND, fine, grey, iron staining, trace silt, moist to wet at 2.5. 4.0	
5			End of Boring at 4.0'	
6				
7				
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG37 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG38
COORDINATES: EAST: 2505816.085 NORTH: 313988.579
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	4	Sunny 85	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.2 60%	**SILTY SAND**, fine, black, damp. 0.5	
2 2.0			SAND, fine, lt grey, trace silt, dry-damp. **BASE-BG38-00 collected at 0.0-1.0 ft, bgs**	
3	S-2	1.3 65%	Note: color change to brown.	
4 4.0			**BASE-BG38-01 collected at 3.0-3.9 ft, bgs** 4.0	
5			End of Boring at 4.0'	
6				
7				
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG38 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG39
COORDINATES: EAST: 2495447.107 NORTH: 316463.322
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	4	Sunny 85	3.5
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1		S-1	1.3 65%	SAND, fine, black and dk grey, trace silt, trace roots, damp.	
				BASE-BG39-00 collected at 0.0-1.0 ft, bgs 1.1	
2	2.0			SILTY SAND, fine, brown, damp-moist. 2.0	
				BASE-BG39-01, -01-DUP, -01-MS/MSD collected at 2.0-3.0 ft, bgs	
3		S-2	1.7 85%		
4	4.0			SAND, fine, brown, trace silt, moist to wet at 3.5'. 4.0	
5				End of Boring at 4.0'	
6					
7					
8					
9					
10					

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG39 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG40
COORDINATES: EAST: 2497485.978 NORTH: 312619.049
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	4	Sunny 85	3.3
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.8 90%	**SAND**, fine, lt brown, trace silt. 0.5 **SILT**, black, organic rich, trace sand, damp. **BASE-BG40-00 collected at 0.0-1.0 ft, bgs**	
2 2.0			1.9	
3	S-2	1.6 80%	**SAND**, fine, brown, little-trace silt, moist to wet at 3.3'. **BASE-BG40-01 collected at 2.0-3.0 ft, bgs**	
4 4.0			4.0	
5			End of Boring at 4.0'	
6				
7				
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG40 SHEET 1 OF 1

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG41
COORDINATES: EAST: 2510352.885 NORTH: 302017.703
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/15/00	4	Partly Cloudy 85	3.9
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.2 60%	**SAND**, fine, grey, trace silt, little roots, dry.	
			BASE-BG41-00 collected at 0.0-1.0 ft, bgs	
2 2.0			Note: color change to brown at 1.0'.	
3	S-2	1 50%	3.0	
4 4.0			**SAND**, fine, dk brown, little silt (organic rich), little roots, moist to wet at 3.9'.	
			BASE-BG41-01 collected at 3.0-3.9 ft, bgs 4.0	
5			End of Boring at 4.0'	
6				
7				
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG41 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG42
COORDINATES: EAST: 2507170.522 NORTH: 295450.911
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	2	Sunny 85	2
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1		S-1	2 100%	**SAND**, fine, brown, trace silt, damp to wet at 2.0'.	
2	2.0			**BASE-BG42-00 collected at 0.0-1.0 ft, bgs** **BASE-BG42-01 collected at 1.0-2.0 ft, bgs** 2.0	
3				End of Boring at 2.0'	
4					
5					
6					
7					
8					
9					
10					

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG42 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG43
COORDINATES: EAST: 2496395.106 NORTH: 305895.110
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	8	Sunny 85	7
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	0.8 40%	SAND, fine, lt grey, dry. BASE-BG43-00 collected at 0.0-1.0 ft, bgs	
2 (2.0)			1.8 SAND, fine, lt brown, trace silt, damp, iron staining.	
3	S-2	1.1 55%	Note: brown and tan with iron staining at 2.0'	
4 (4.0)				
5	S-3	1.8 90%		
6 (6.0)			BASE-BG43-02 collected at 5.0-7.0 ft, bgs	
7	S-4	1.5 75%	Note: wet at 7.0'	
8 (8.0)			8.0	
9			End of Boring at 8.0'	
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG43 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG44
COORDINATES: EAST: 2487384.105 NORTH: 310301.978
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	8	Sunny 85	8
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.6 80%	**SAND**, fine, lt brown, trace silt, trace roots, dry. **BASE-BG44-00 collected at 0.0-1.0 ft, bgs**	
2 2.0				
3	S-2	1.9 95%	Note: little silt at 2.0'	
4 4.0				
5	S-3	1 50%	Note: iron staining and little silt, trace clay at 4.0'	
6 6.0				
7	S-4	1.1 55%	Note: wet at 8.0' **BASE-BG44-03 collected at 6.0-8.0 ft, bgs**	
8 8.0			8.0	
9			End of Boring at 8.0'	
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG44 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371
BORING NO.: BASE-BG45
COORDINATES: EAST: 2483979.537
NORTH: 312295.165
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/17/00	4	Sunny 80	3.3
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium
v = very
lt = light
dk = dark
NA= not applicable/not available
ft or ' = feet
bgs = below ground surface
MSL= mean sea level

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1 – 2.0	S-1	1 50%	**SAND**, fine, lt grey, trace silt, dry. **BASE-BG45-01, -01-DUP, -01-MS/MSD collected at 2.0-3.0 ft, bgs** 1.8	
2 – 2.0			**SILT**, brown, trace fine sand, damp. **BASE-BG45-01, -01-DUP, -01-MS/MSD collected at 2.0-3.0 ft, bg** 2.2	
3 – 4.0	S-2	1 50%	**SILTY SAND**, fine, grey and brown, trace clay, damp to wet at 3.3'. 4.0	
4 – 5			End of Boring at 4.0'	
6				
7				
8				
9				
10				

DRILLING COMPANY Parratt-Wolff
DRILLER: Brian Waters and Jim Wheelin
BAKER REP.: James S. Culp
BORING NO.: BASE-BG45 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG46
COORDINATES: EAST: 2470248.313 NORTH: 304238.542
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/13/00	6	Sunny 80	6
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1		S-1	1.3 65%	SAND, fine, lt grey, trace to no silt, dry.	
				BASE-BG46-00 collected at 0.0-1.0 ft, bgs 1.0	
2	2.0			SAND, fine, lt brown, trace silt, damp. 2.0	
3		S-2	1.7 85%	SAND, dk brown, little silt, damp-moist.	
4	4.0			**BASE-BG46-02 collected at 3.0-4.0 ft, bgs**	
5		S-3	2 100%	Note: wet at 4.0'.	
6	6.0			6.0	
7				End of Boring at 6.0'	
8					
9					
10					

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG46 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG47
COORDINATES: EAST: 2465137.153 NORTH: 309651.216
ELEVATION SURFACE: NA

Rig: CME-35 Truck Mount	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/16/00	24	Sunny 75	2.2
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks: Water table is perched on thick clay. Ran out of equipment to advance below 24'.

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.6 80%	**SAND**, fine, dk brown becoming tan-white, trace silt, dry. **BASE-BG47-00 COLLECTED AT 0.0-1.0 ft, bgs**	
2 2.0				
			Wet at 2.2'. 2.2	
3	S-2	1.8 90%	**SAND**, fine, lt brown mottled with yellow-brown, little-some silt, trace clay, wet. 3.1	
			CLAY, grey mottled with lt red, trace fine sand, moist. 3.3	
4 4.0			**SAND**, fine, lt brown mottled with yellow-orange, some clay, moist. 4.0	
5	S-3	2 100%	**CLAY**, lt brown-grey mottled with yellow-orange, trace fine sand, moist, plastic.	
6 6.0				
7	S-4	2 100%	7.1	
			CLAY, grey, little-some fine sand, moist, plastic.	
8 8.0			Note: interbedded clay and fine sand at 7.9-7.95'	
9	S-5	1.8 90%	**BASE-BG47-04 COLLECTED AT 8.0-10.0 ft, bgs**	
10 10.0				
			Match to Sheet 2	

DRILLING COMPANY Parratt-Wolff BAKER REP.: Nathanael Barta
DRILLER: Louis Lefever and Justin Abreu BORING NO.: BASE-BG47 SHEET 1 OF 2

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
CTO NO.: 62470-371 BORING NO.: BASE-BG47

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
med = medium
v = very
lt = light
dk = dark
ft or ' = feet
bgs = below ground surface
MSL= mean sea level

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
10			Match to Sheet 1	
11	S-6	1.5 75%	Same.	
12 12.0				
13	S-7	2 100%		
14 14.0				
15	S-8	1.8 90%	Same clay, except trace sand, moist.	
16 16.0				
17	S-9	1.6 80%		
18 18.0				
19	S-11	2 100%		
20 20.0				
21	S-12	2 100%		
22 22.0			22.0	
23	S-10	2 100%	**SAND**, fine, and **SILT**, grey, dry.	
24 24.0			24.0	
25			End of Boring at 24.0'	
26				
27				
28				
29				

DRILLING COMPANY: Parratt-Wolff
DRILLER: Louis Lefever and Justin Abreu
BAKER REP.: Nathanael Barta
BORING NO.: BASE-BG47 SHEET 2 OF 2

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG48
COORDINATES: EAST: 2458413.613 NORTH: 316709.888
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/12/00	6	Sunny 75	NA
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.1 55%	SAND, fine, black and grey, trace silt, little roots, dry. 0.5	
			BASE-BG48-00 collected at 0.0-1.0 ft, bgs	
2			SAND, fine, lt grey, dry. 2.0	
3	S-2	1.2 60%	SAND, fine, lt brown, trace silt, moist.	
			BASE-BG48-02 collected at 3.0-4.0 ft, bgs	
4				
5	S-3	1.6 80%	Note: organic-rich silt intermixed with sand. Wet at 4.5'.	
6			6.0	
7			End of Boring at 6.0'	
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG48 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG49
COORDINATES: EAST: 2469737.534 NORTH: 325640.088
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/12/00	6	Sunny 75	6
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.6 80%	**SAND**, fine, lt brown, trace to no silt, little roots, dry. Note: no roots at 0.6'. **BASE-BG49-00 collected at 0.0-1.0 ft, bgs**	
2 2.0			2.0	
3	S-2	1.2 60%	**SILT**, fine, lt brown, little fine sand, trace clay, moist. **BASE-BG49-03, -03-DUP and -03-MS/MSD collected at 5.0-6.0 ft, bgs** Note: clay content increasing with depth.	
4 4.0				
5	S-3	1.6 80%	Note: trace to little clay, wet at 6.0'.	
6 6.0			6.0	
7			End of Boring at 6.0'	
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG49 SHEET 1 OF 1

Baker Environmental

TEST BORING RECORD

PROJECT: MCB Camp Lejeune Base Background Study
PROJ. NO.: 62470-371 BORING NO.: BASE-BG50
COORDINATES: EAST: 2457745.035 NORTH: 326066.337
ELEVATION SURFACE: NA

Rig: Tripod Geoprobe	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather (F)	Depth to Water (Ft.)
Size (ID)	1.5"				7/12/00	4	Cloudy 75	3.1
Length	2.0'							
Type	Stainless							
Hammer Wt.	NA							
Fall	NA							

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS
med = medium ft or ' = feet
v = very bgs = below ground surface
lt = light MSL= mean sea level
dk = dark
NA= not applicable/not available

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	Visual Description	Elevation (Ft. MSL)
1	S-1	1.4 70%	**SAND**, fine, dk to lt grey, trace silt, damp. 0.7	
			SAND, fine, dk brown, little silt, damp. 0.9	
2 2.0			**BASE-BG50-00 collected at 0.0-1.0 ft, bgs**	
			SAND, fine, brown, trace silt, damp. 2.0	
3	S-2	2 100%	**BASE-BG50-01 collected at 2.0-3.0 ft, bgs**	
			SAND, dk brown, trace silt, damp to wet at 3.1'.	
4 4.0			4.0	
5			End of Boring at 4.0'	
6				
7				
8				
9				
10				

DRILLING COMPANY Parratt-Wolff BAKER REP.: James S. Culp
DRILLER: Brian Waters and Jim Wheelin BORING NO.: BASE-BG50 SHEET 1 OF 1

APPENDIX C
TECHNICAL MEMORANDUM

SUMMARY OF GROUNDWATER DATA AND AQUIFER CHARACTERISTICS MARINE CORPS BASE, CAMP LEJEUNE JACKSONVILLE, NORTH CAROLINA

SUMMARY

This study examines the utility of exploratory aquifer tests (pump tests) at investigation sites across Marine Corps Base, Camp Lejeune (MCB-CL). The study reviews the available information on the relevant water-bearing layers, considers the general characteristics and applicability of aquifer tests, and concludes:

- That available information is satisfactorily complete to allow appropriate designs of groundwater systems in the main operating areas of MCB-CL;
- That quantified characterization of the water-bearing layers in explored areas of MCB-CL can be extended to other areas having similar geologic terrane;
- That exploratory tests are no longer routinely required or advisable;
- That reconnaissance testing (well-head tests or slug tests) of each newly installed or otherwise uncharacterized data station is highly advisable; and,
- That performance testing of groundwater extraction systems should be the recommended form of evaluating and adjusting withdrawal systems.

BACKGROUND

This study considers the aquifer characteristics (especially, the Coefficient of Transmissivity) and the production capacities (available discharge rates) of the two water-bearing layers relevant to the studies at MCB-CL. These water-bearing layers are the (shallow or surficial) water table and the Upper Castle Hayne Aquifer.

The water table at MCB-CL occupies the water-bearing zone within 25 to 35 feet of the surface; the Castle Hayne, immediately below this. However, the separation of the water table and the Castle Hayne is not always obvious. Usually, this separation is effected only by the low permeability material of the water table transiting to the significantly more permeable material of the Upper Castle Hayne; there is rarely an aquiclude or aquitard of vertically extensive clay separating the water table from the Castle Hayne.

The data available for this summary derive from three main sources:

- Assessment of Hydrologic and Hydrogeologic Data at Camp Lejeune Marine Corps Base, North Carolina; U.S. Geological Survey, Water-Resources Investigation Report 89-4096; 1989
- Wellhead Management Program Engineering Study 91-36; Geophex, Ltd.; 22Jan91
- Various site investigations by Baker Environmental, Inc., and reported to LANTDIV and MCB-CL

DISTRIBUTION OF DATA

The data available from the various sources have been compiled on Tables 1, 2 and 3, with Table 3 summarizing the relevant flow information. The accompanying map indicates the distribution of stations from which data are available.

The tabulated data indicate the main characteristics of each water-bearing layer:

- There is low available production from the water table.
- There is an excessive availability of production from the Castle Hayne compared to the probably acceptable levels of treatment volumes foreseeable in groundwater remediation systems.

The water table had production capacities of less than 5 gallons per minute (gpm) in all cases tested. The specific capacities of the discharge wells were always less than 1 gallon per minute per foot of drawdown (gpm/ft). The transmissivities calculated were generally near or below 1000 gallons per day per foot of drawdown (gpd/ft); only the deeper wells, which intercepted at least part of the Castle Hayne, had transmissivities in a range indicative of an acceptably producing zone. The hydraulic conductivity values were commonly in the range of tenths of feet per day (ft/d). The low production rates, low transmissivities and low hydraulic conductivities indicate that the water table is only marginally, at best, under Darcian conditions. Calculations based on these data would, therefore, be highly unreliable. However, the available information all indicate an expectably low rate of groundwater discharge, which in turn would produce only a narrow radius of effect around an individual production well:

> The standard equation for calculation of the radius of capture around an individual well is $r_c=720Q/\pi Ti$. With a discharge rate (Q) of 3 gpm, a transmissivity (T) of 500 gpd/ft and a representative gradient of 0.005, the radius of capture would be 275 ft. However, this calculation applies only to Darcian conditions in a homogeneous medium; the water table at MCB-CL is marginally Darcian and is highly non-homogeneous. The calculation of radius must, therefore, be in some degree of error, with no more usable data or calculation possible.

The Castle Hayne has production capacities generally ranging above 200 gpm. The estimated transmissivities are at least in the range of several tens of thousands gpd/ft, with specific capacities usually about 5 to 10 gpm/ft. The calculated hydraulic conductivities are usually in the scores of feet per day. The available discharge from the Castle Hayne is, therefore, much greater than that from the water table. The limiting factor in remediation schemes for the Castle Hayne then becomes the amount of water that can be treated by an affordable system, usually less than 500 gpm; this value of 500 gpm would be available from one or two wells in the Castle Hayne. The high values of aquifer parameters, the relatively low total discharge and the low number of production wells would conspire to limit the radius of effect available to a remediation scheme:

> The standard equation for calculation of the radius of capture around an individual well is $r_c=720Q/\pi Ti$. With a Q of 500 gpm, a T of 50000 gpd/ft and a representative gradient of 0.005, the radius of capture would be only 460 ft.

COMPARABILITY OF DATA ACROSS MCB-CL

The stratigraphic sequences of MCB-CL containing the water table and the Upper Castle Hayne have been well characterized. The available information indicates that the lithology and the hydrologic conditions can be correlated stratigraphically across the base (Tables 1 and 2). From these correlations, aquifer performance can be predicted sufficiently for an engineering design whose final criteria for suitability are performance-based.

The upper water-bearing zone is a highly variable layering and intercalation of clay, silt and sand. This variability, however, is found within recognizable limits. These limits correspond to the range of hydrologic characteristics described previously. Similar correlation is available for the lithology and hydrology of the Upper Castle Hayne.

In areas not near stations catalogued in Tables 1, 2 and 3, a reconnaissance comparison of well-head tests (slug tests) and an examination of lithologic descriptions will likely be sufficient to support the engineering evaluation of the site. There is ample demonstration that lithology has a significant influence on the hydrology of a site, and that, for a given geologic terrane, the influence is fairly consistent. The geologic terrane of MCB-CL has been broadly characterized and correlated between lithologic (stratigraphic descriptions) and hydrologic (aquifer tests and well-head tests) sequences. Lithologic descriptions can now provide a good indication of hydrologic conditions at MCB-CL in areas of similar terrane.

GENERAL APPLICABILITY OF AQUIFER TESTS

Aquifer (pump) tests are an extremely dangerous activity at contamination sites. While the information available from aquifer tests is required for engineering design of withdrawal systems, aquifer tests should not be a reconnaissance or an initial step in the investigation. Full consideration must be made of the redistribution of contaminants expectable from the test, of the change in structural support of disposal features by relaxation or increase of hydrostatic loading, and so forth.

Consideration must also be made of alternative sources of acceptable data on the aquifer. In the case of MCB-CL, alternatives to exploratory aquifer tests are available from the tabulation and correlation of aquifer characteristics, production performance and geologic terrane presently available.

From the available information and in light of the relative consistency of the geologic terrane of MCB-CL, exploratory tests at MCB-CL are not generally required. Therefore, exploratory tests are not advisable and should not form part of the initial investigation of a site. While they may be useful in certain circumstances after the initial investigation of a site, they should not, in the general case, be part of the investigation. Sufficiently satisfactory information is presently available to allow the initial engineering design of a groundwater response.

While exploratory aquifer tests are not advisable, performance tests of a newly installed system are highly recommended. These tests, to some extent, are a normal part of the initial operation of a system. Only minor additional monitoring and modification of the system during operation would provide data directly relevant to the long-term operation of that system.

In the Coastal Plain of MCB-CL, the information from an exploratory data station not coincident with the long-term extraction system is not fully transferable. That is, if the test station and the

recovery station are not the same, the aquifer parameters and calculations based on those parameters will differ. This means that data from an exploratory station are no more reliably usable that the data presently available, unless the exploratory station is collocated with the recovery system. However, if the exploratory and recovery stations are identical, and considering that alternative sources of acceptable data on the aquifer are available and that a performance test must be run as part of the initial operation of a recovery system, the exploratory test represents a superfluous duplication of effort.

TABLE 1
CAMP LEJEUNE PUMP TEST DATA

Well Number	Well Depth (ft,BGS)	Well Diameter (in)	Total Aquifer Thickness (ft)	Screened Length (ft)	Screened Interval (ft,BGS)	Water-level Drawdown During Pumping (ft,BGS)	Pumping Rate (Recovery wells) GPM	Duration of Pumping (min)	Specific Capacity (pumping rate/ drawdown)	T (square ft/ day)	K (ft/day)	S	Soils (ft,BGS)
013RW-01*	23	2	15	20	3-23	8.773	1	480	0.11	7.17	0.48	NA	0-10 silt/clay, 10-23 sand.
013MW-18	13	2	15	10	3-13	0.297	NA	480	NA	105.98	7.06	1.40E-02	0-7 silt/clay, 7-13 sand.
013MW-21	14	2	15	10	4-14	0.31	NA	480	NA	82.27	5.48	2.77E-02	0-4 silt/sand, 0-14 clay/silt
108RW-01*	15	2	9	9.1	2.45-11.55	6.38	0.5	485	0.08	5.30	0.59	NA	very fine sand
108MW-04		2	9				NA	485	NA	118.63	13.18	1.33E-02	
108MW-15	12.5	2	9	9.03	2.79-11.82		NA	485	NA	56.78	6.31	7.33E-03	0-8 sand/silt, 8-10 silt/clay
109MW-15		2	15			0.939	NA	460	NA	76.26	5.08	1.11E-02	
109MW-17	14.5	2	15	10	4.5-14.5	0.545	NA	460	NA	163.10	10.87	7.30E-03	0-15 fine sand
109RW-01*	15	2	15	9.5	2-11.5	6.265	3	460	0.48	7.80	0.52	NA	0-4 sand, 4-8 silt, 8-15 sand
0RW-01* (Drawdown,Theis)	21.8	2	50	19.2	2-21.2	9.53	3	475	0.31	200.02	4.00	NA	0-10.5 sand/silt, 10.5-15 sand/clay, 15-21.5 sand/clay, 21.5- sand
0RW-01* (Drawdown,Cooper)										161.86	3.24	NA	
0RW-01* Recovery(Theis)										106.06	2.12	NA	
10DW-01 (Drawdown,Theis)	30.3	2	50	4.8	24.9-29.7	0.02	3	475	NA	7080.48	142.00	4.52E-03	0-4 sand/silt, 4-10.5 clay, 10.5-15.5 sand/silt,15.5-20.5 clay, 20.5-on sand
10DW-01 (Drawdown,Cooper)									NA	7099.20	142	4.51E-03	
10DW-02 (Drawdown,Theis)	30	2	50	4.7	24.7-29.4	0.52	NA	475	NA	5398.56	108.00	1.51E-03	0-3 sand and silt with clay layers, 3-11 sand and silt, 11-30 sand with some limited clay layers
10DW-02 (Drawdown,Cooper)									NA	5400.00	108	1.51E-03	
10DW-03 (Drawdown,Theis)	30	2	50	4.9	24.5-29.4	0.47	NA	475	NA	2952.00	59.00	7.48E-02	0-6 sand and silt , 6-12 sand, 12-23 sand/clay, 23-30 sand
10DW-03 (Drawdown,Cooper)									NA	3225.60	64	5.85E-02	

= Transmissivity
= Hydraulic Conductivity
= Storativity
= Pumping well
- Not applicable

TABLE 2

HYDRAULIC CONDUCTIVITY TEST RESULTS (SLUG TEST)

Well Number	Well Depth (ft,BGS)	Well Diameter (in)	Saturated Aquifer Thickness* (ft)	Screened Length (ft)	Screened Interval (ft,BGS)	K Rising (ft/day)	Soils (ft,BGS)
013MW-03	14	2	1	9.8	4-13.8	0.75	0-6 clay, 6-14 silt
013MW-04	14	2	8.13	9.8	4-13.8	0.27	0-8 clay, 8-14 silt
013MW-11	16	2	9.14	10	6-16	0.37	0-4 sand/silt, 4-14 clay, 14-16 sand
013MW-21	14	2	9.2	10	4-14	0.46	0-4 silt/sand, 4-14 clay
108MW-08	12.8	2	8.83	9.7	2.7-12.4	0.59	0-8 very fine sand, 8-12 clayey peat, 12-13 sandy clay
108MW-09	12.8	2	7.81	9.7	2.8-12.5	0.53	0-13 silt/sand
108MW-13	10.8	2	NA	9.02	0.69-9.71	0.061	0-2 very fine sand, 8-9.5 sandy clay
108MW-17	13.1	2	NA	9.03	3.39-12.42	0.59	0-8 fine grained sand, 8-9 clayey peat, 9-12.5 sandy clay
109MW-17	14.5	2	9.04	10	4.5-14.5	9.00	0-15 fine sand
109MW-18	14	2	10.19	10	4.5-14.5	5.70	0-3 sand, 3-10 silt, 10-14 sand
110MW-07	11.96	2	9	9.8	1.5-11.3	0.0115	0-2 clay/silt, 2-4 clay/sand, 4-6 sand, 6-10 silt/clay, 10-14 silt /sand
110MW-09	14.2	2	9.47	9.8	3.8-13.6	0.16	0-6 sand/silt, 6-9 clay/silt, 9-12 sand/silt, 12-14 clay
110DW-03	30	6	22.04	4.9	24.5-29.4	1.07	0-3 sand, 3-4 clay, 4-10 sand/silt, 10-12 sand, 12-13 clay,13-22 silt/clay, 22-30 sand
41GW-07	20.5	2	12.03	10	10.5-20.5	1.15	1-5 silty sand, 5-9 clay, 9-10 silty sand, 10-12 fill, 12-16 silty sand with 1 ft clay layer,16-21 sand
41GW-08	15	2	9.48	10	5-15	0.14	0-1 silty sand, 1-6 sand, 6-14 clay with sand and silt, 14-16 silty sand
41GW-09	21	2	11.89	10	11-21	3.67	0-5 clay and sand, 5-21 silty sand
41GW-10	13	2	8.59	10	3-13	0.94	0-2 silty sand, 2-7 sand, 7-9 silty sand and clay, 9-12 lithified sandstone, 12-13 sand. 13-14 lithified sandstone
41GW-12	16	2	12.45	10	6-16	4.57	0-4 silty sand, 4-14 sand, 14-17 lithified sandstone
69GW-09	20.5	2	14.22	10	10.5-20.5	1.7	1-4 Sand/silt, 4-10 clay some sand, 10-21 sand/silt
69GW-10	16	2	10.5	10	6-16	0.17	1-17 sand/silt
69GW-12	12.5	2	11.27	10.5	2-12.5	0.12	0-13.5 sand/silt
69GW-02D	125	2	22.1	10	40-50	0.29	0-125 silty sand **
69GW-12D	58	2	53.83	10	48-58	6.66	0-58 silty sand **
74GW-03A	18	2	13.58	10	8-18	0.59	0-17 silty sand, 17-18.5 sandy clay
74GW-06	16.5	2	8.18	9.74	15.5-26	6.33	1-26 sand/silt
74GW-08	23	2	10.51	10	13-23	3.55	0-1 silty sand, 1-24 sand

* Values taken from AQTESOL results. (Bottom of screened interval- water level)

** Due to depth, soils were very generally described.

K = Hydraulic Conductivity

TABLE 3

BARONE:8SEP94:CL5-1A1:1/5

}-CL5 CTO-232 CL5-1B1.wks 8SEP94 MCB-CAMP LEJEUNE

STATION	b ft	Q gpm	Sc gpm/ft	T ft-sq/d	T gpd/ft	K ft/d
013RW-01	15	1.0	0.11	7.2	54	0.5
013MW-1	15			106.0	793	7.1
013MW-2	15			82.3	615	5.5
013MW-03	1					0.8
013MW-04	8					0.3
013MW-11	9					0.4
013MW-21	8					0.5
41GW-07						1.2
41GW-08						0.1
41GW-09						3.7
41GW-10						0.9
41GW-12						4.6
69GW-09						1.7
69GW-10						0.2
69GW-12						0.1
69GW-02DW						0.3
69GW-12DW						6.7
74GW-03A						0.6
74GW-06						6.3
74GW-08						3.6
108RW-01	9	0.5	0.08	5.3	40	0.6
108MW-0	9			118.6	887	13.2
108MW-1	9			56.8	425	6.3
108MW-08	9					0.6
108MW-09	8					0.5
108MW-13	8					0.1
108MW-17	8					0.6
109MW-1	15			76.3	570	5.1
109MW-1	15			163.1	1220	10.9
109RW-01	15	3.0	0.48	7.8	58	0.5
109MW-17	15					9.0
109MW-18	15					5.7
110RW-01	50	3.0	0.31	200.0	1496	4.0
110RW-01	50	3.0	0.31	161.9	1211	3.2
110RW-01	50	3.0		106.1	793	2.1
110DW-01	50			7080	52962	142.0
110DW-01	50			7099	53102	142.0
110DW-02	50			5399	40381	108.0
110DW-02	50			5400	40392	108.0
110DW-03	50			2952	22081	59.0
110DW-03	50			3226	24127	64.0
110MW-07	9					0.1
110MW-09	9					0.2
110DW-03	22					5.8

STATION	b ft	Q gpm	Sc gpm/ft	T ft-sq/d	T gpd/ft	K ft/d
BB-43	275	170	5.0	8900	66572	32.4
BB-44	275	450	10.0	17900	133892	65.1
BB-222	275	329	9.4	10600	79288	38.5
HP-612	285	275	5.4	7900	59092	27.7
HP-614	285	323	4.9	6600	49368	23.2
HP-621	300	200	9.1	24500	183260	81.7
HP-628	320	160	3.4	6400	47872	20.0
HP-629	300	210	5.7	7900	59092	26.3
HP-634	300	163	4.5	4300	32164	14.3
HP-636	300	211	6.8	6900	51612	23.0
HP-643	295	278	5.3	9700	72556	32.9
HP-644	300	246	4.3	8100	60588	27.0
HP-646	305	304	10.6	20200	151096	66.2
HP-647	305	500	9.8	18700	139876	61.3
HP-648	310	250	2.9	5600	41888	18.1
HP-649	310	257	2.6	5000	37400	16.1
HP-651	305	270	3.8	7300	54604	23.9
HP-652	320	218	2.2	4400	32912	13.8
HP-663	325	350	4.8	6400	47872	19.7
HP-699	275	250	5.7	7700	57596	28.0
HP-700	270	250	6.8	11500	86020	42.6
HP-701	275	250	7.2	12400	92752	45.1
HP-705	295	250	9.0	13100	97988	44.4
HP-706	300	250	3.8	4700	35156	15.7
HP-709	310	200	4.4	8500	63580	27.4
HP-710	310	200	5.1	9900	74052	31.9
HP-711	320	200	6.8	10700	80036	33.4
LCH-4006	295	540	10.0	14500	108460	49.2
LCH-4007	295	275	11.8	13700	102476	46.4
M-267	260	170	7.7	10300	77044	39.6
M-628	260	70	3.0	6100	45628	23.5
RR-229	290	429	12.2	19400	145112	66.9
TT-25	280	150	5.0	7200	53856	25.7

STATION	PUMPING LEVEL	Q gpm	Sc gpm/ft
HP-602	44	154	3.5
HP-603	30	129	4.3
HP-606	38	267	7.0
HP-607	46	246	5.3
HP-608	21	208	9.9
HP-609	45	199	4.4
HP-610	14	214	15.3
HP-613	17	157	9.2
HP-616	15	178	11.9
HP-620	9	224	24.9
HP-622	55	330	6.0
HP-623	30	210	7.0
HP-628	45	172	3.8
HP-629	45	216	4.8
HP-632	21	224	10.7
HP-633	18	205	11.4
HP-634	36	219	6.1
HP-635	33	151	4.6
HP-636	35	149	4.3
HP-637	40	130	3.3
HP-638	84	201	2.4
HP-639	52	[--]	0.0
HP-640	28	210	7.5
-641	44	351	8.0
-642	32	[--]	0.0
HP-643	35	269	7.7
HP-644	52	230	4.4
HP-645	40	192	4.8
HP-646	11	154	14.0
HP-647	26	302	11.6
HP-648	84	263	3.1
HP-649	80	100	1.3
HP-650	75	480	6.4
HP-651	69	242	3.5
HP-652	82	216	2.6
HP-653	29	197	6.8
HP-654	30	175	5.8
HP-655		[--]	ERR
HP-660		150	ERR
HP-661	37	275	7.4
HP-662	53	148	2.8
HP-663	23	100	4.3
HP-698	33	216	6.5
HP-699	21	140	6.7

STATION	PUMPING LEVEL	Q gpm	Sc gpm/ft
HP-700	39	192	4.9
HP-701	36	236	6.6
HP-703	33	293	8.9
HP-704	38	159	4.2
HP-705	25	214	8.6
HP-706	33	214	6.5
HP-707	51	50	1.0
HP-708	42	219	5.2
HP-709	52	239	4.6
HP-710	29	115	4.0
HP-711	56	235	4.2
HP-5186	38	336	8.8
LCH-4007	34	150	4.4
LCH-4009	22	349	15.9
TT-23	36	160	4.4
TT-25	22	130	5.9
TT-26	32	127	4.0
TT-31	28	111	4.0
TT-52	18	236	13.1
TT-54	20	119	6.0
TT-67	29	119	4.1
RR-45	11	192	17.5
RR-47	5	140	28.0
RR-97	14	170	12.1
RR-229	35	[--]	0.0
BB-44	11	125	11.4
BB-47	6	341	56.8
BB-218	17	192	11.3
BB-220	13	119	9.2
BB-221	19	230	12.1
TC-325	8	100	12.5
TC-502	1	180	180.0
TC-504	35	203	5.8
TC-600	32	172	5.4
TC-604	16	137	8.6
TC-700	28	125	4.5
TC-901	37	[--]	0.0
TC-1000	25	110	4.4
TC-1001	16	160	10.0
TC-1251	6	150	25.0
TC-1253	5	128	25.6
TC-1254	3	122	40.7
TC-1255	36	104	2.9
TC-1256	48	108	2.3

STATION	PUMPING LEVEL	Q gpm	Sc gpm/ft
AS-108	8	226	28.3
AS-131	11	310	28.2
AS-190	60	220	3.7
AS-191	16	220	13.8
AS-203	19	220	11.6
AS-4140	6	110	18.3
AS-4150	10	128	12.8
AS-5001	27	185	6.9
AS-5009	53	111	2.1
BA-164	21	214	10.2
BA-190	17	303	17.8

APPENDIX D
CHAIN-OF-CUSTODY RECORDS

2

CompuChem
a division of Liberty Analytical Corp.
501 Madison Avenue
Cary, NC 27513
1-800-833-5097

CHAIN-OF-CUSTODY RECORD

No. 051482

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRONMENTAL	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER RD	Telephone No.: +1(412)269-2098
Airbill No.: 818028326987/26/65	CORAOPOLIS PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: CJK	Project-specific (PS) or Batch (B) QC ?

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other FIELD BLANK

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other_____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other_____
T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		RH		
AOC8RB01	7/15	08:15	4		—			1							✓					✓		
AOC9RB02	7/15	08:15	4		—			1							✓					✓		
AOC7RB03	7/15	15:35	4		—			1							✓					✓		
AOC9RB04	7/15	08:35	4		—			1							✓					✓		
AOC8FA01	7/15	08:30	9		—			1							✓					✓		
AOC9FB02	7/15	08:20	9		—			1							✓					✓		
AOC10RB05	7/16	09:30	4		—			1							✓					✓		
AOC11RB06	7/16	09:50	4		—			1							✓					✓		
	/	:																				
	/	:																				

PAGE 1 of 1

Remarks / Comments (see Notes 2 & 3)

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) EJ Klein Jr. Date: 7/17/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1700	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) FED EX Date: 7/17/00	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time: 1700	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

CompuChem

a division of Liberty Analytical Corp.

501 Madison Avenue
Cary, NC 27513
1-800-833-5097

CHAIN-OF-CUSTODY RECORD

No. 051484

Project Name: MCB CLEF BACKGROUND STUDY	Client Address: BAKER ENVIRON. 420 ROUSER RD. CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/262-2094
Airbill No.: 818028326987 7/26/65		Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC? ____

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other____
T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
AOC8BG1100	7/14	15:20	S	E	—			1							✓					✓			
AOC8BG1105	7/14	15:47	S	E	—			1							✓					✓			
AOC8BG1200	7/14	16:12	S	E	—			1							✓					✓			
AOC8BG1202	7/14	16:26	S	E	—			1							✓					✓			
AOC8BG1202	7/14	16:26	S	E	—			1	DUP						✓					✓			DUPLICATE
AOC8BG0600	7/14	17:00	S	E	—			1							✓					✓			
AOC8BG06	7/14	17:40	S	E	—			1							✓					✓			
AOC8BG0400	7/14	08:25	S	E	—			1							✓					✓			
AOC8BG0400	7/14	08:25	S	E	—			1	MS/MSD						✓					✓			MS/MSD
AOC8BG0405	7/14	08:52	S	E	—			1							✓					✓			

Clients Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

Temperature ____ °C

#1 Relinquished By: (Sig) E.J. Klink Date: 7/17/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1700	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) FED EX Date: 7/17/00	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time: 1700	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051480

Project Name : MCB CLEF BACKGROUND STUDY
Carrier : FED EX
Airbill No. : 819828326987/76/63
Sampler Name : VARIOUS

Client Address : BAKER ENVIRON. 420 ROUSER RD CORAOPOLIS, PA 15108
Sampler Signature : E. J. K.

Point-of-Contact : JIM CULP
Telephone No. : 412/269-2098
Sampling complete? (Y) or N (see Note 1)
Project-specific (PS) or Batch (B) QC ? ____

BOX #1 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil / Sediment / Sludge 6. Trip Blank 7. Oil 8. Waste 9. Other____

BOX #2 A. HCl + Ice B. HNO3 + Ice C. NaOH + Ice D. H2SO4 + Ice E. Unpreserved F. Ice Only G. Other____ H. NaHSO4 + Ice I. ZnAc+NaOH + Ice

BOX #3 F. Filtered U. Unfiltered

Box #4 H. High M. Medium L. Low

Box #5 C. CLP 3/90 S. SW-846 W. CWA 600-series O. Other____ T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		TCLP		
A0C8BG0500	7/15	09:16	S	E	—			1							✓					✓		
A0C8BG0504	7/15	09:25	S	E	—			1							✓					✓		
A0C8BG0800	7/15	16:20	S	E	—			1							✓					✓		
A0C8BG0801	7/15	16:22	S	E	—			1							✓					✓		
A0C8BG1400	7/15	12:25	S	E	—			1							✓					✓		
A0C8BG1401	7/15	12:30	S	E	—			1							✓					✓		
A0C8BG0200	7/15	10:22	S	E	—			1							✓					✓		
A0C8BG0205	7/15	10:45	S	E	—			1							✓					✓		
A0C8BG0100	7/15	09:42	S	E	—			1							✓					✓		
A0C8BG0104	7/15	10:03	S	E	—			1							✓					✓		

Remarks / Comments (see Notes 2 & 3)

Clients Special Instructions:

Lab: Received in Good Condition? Y or N Describe Problems, If any:

Temperature ____ °C

#1 Relinquished By: (Sig) E. J. Klein	Date: 7/17/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/17/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051481

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRON. 420 ROUSER ROAD CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/264-2098
Airbill No.: 818028326987/76/65		Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1 1. Surface Water, 2. Ground Water, 3. Leachate, 4. Rinsate, 5. Soil / Sediment / Sludge, 6. Trip Blank, 7. Oil, 8. Waste, 9. Other____

BOX #2 A. HCl + Ice, B. HNO3 + Ice, C. NaOH + Ice, D. H2SO4 + Ice, E. Unpreserved, F. Ice Only, G. Other____, H. NaHSO4 + Ice, I. ZnAc+NaOH + Ice

BOX #3 F. Filtered, U. Unfiltered

Box #4 H. High, M. Medium, L. Low

Box #5 C. CLP 3/90, S. SW-846, W. CWA 600-series, O. Other____, T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
A0C8BG0900	7/15	16:48	S	E	—			1							✓					✓		
A0C8BG0903	7/15	17:15	S	E	—			1							✓					✓		
A0C8BG0300	7/15	12:05	S	E	—			1							✓					✓		
A0C8BG0301	7/15	12:18	S	E	—			1							✓					✓		
A0C8BG0700	7/15	13:51	S	E	—			1							✓					✓		
A0C8BG0702	7/15	13:56	S	E	—			1							✓					✓		
A0C8BG1306	7/15	14:25	S	E	—			1							✓					✓		
A0C8BG1301	7/15	14:30	S	E	—			1							✓					✓		
A0C8BG1400	7/15	12:25	S	E	—			1							✓					✓		
A0C8BG1401	7/15	12:30	S	E	—			1							✓					✓		

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E.J. Klein	#2 Relinquished By: (Sig)	#3 Relinquished By: (Sig)
Date: 7/17/00	Date:	Date:
Company Name: BAKER	Company Name:	Company Name:
Time: 1200	Time:	Time:
#1 Received By: (Sig) FED EX	#2 Received By: (Sig)	#3 Received By: (Sig)
Date: 7/17/00	Date:	Date:
Company Name:	Company Name:	Company Name:
Time: 1700	Time:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051485

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: MAKER ENVIRON. 420 ROUSER RD CORAOPOLIS, PA 15108	Point-of-Contact: TIM CULP
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.: 818028326987/76/65		Sampling complete? Y or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC?

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other_____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other_____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other_____
T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2006	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Pb		Remarks / Comments (see Notes 2 & 3)
AOCBAG0405	7/14	08:52	S	E	—			1	DUP						✓				✓		DUPLICATE
AOCBAG1000	7/15	16:30	S	E	—			1							✓				✓		
AOCBAG1008	7/15	16:50	S	E	—			1							✓				✓		
	/	:																			
	/	:																			
	/	:																			
	/	:																			
	/	:																			
	/	:																			
	/	:																			

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Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) EJK	Date: 7/17/06	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: MAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/17/06	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051491

Project Name: MCB CLEET BACKGROUND STUDY	Client Address: BAKER ENVIRON. 420 ROUSER RD. CORAOPOLIS, PA 15108	Point-of-Contact: TIM CUCO
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.: 8180283826987/726/65		Sampling complete? (Y) or N (see Note 1)
Sampler Name: D. SCHILLING	Sampler Signature:	Project-specific (PS) or Batch (B) QC ? ____

BOX #1 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2 A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3 F. Filtered; U. Unfiltered

Box #4 H. High; M. Medium; L. Low

Box #5 C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
AOC10B0100	7/16	08:10	S	E	—			1							✓					✓		
AOC10B0103	7/16	08:35	S	E	—			1							✓					✓		
AOC10B0103	7/16	08:35	S	E	—			1	DUP						✓					✓		DUPLICATE
AOC10B0103	7/16	08:35	S	E	✓			1	MS/MSD						✓					✓		MS/MSD
AOC10B0200	7/16	09:31	S	E	—			1							✓					✓		
AOC10B0203	7/16	09:35	S	E	—			1							✓					✓		
AOC10B0300	7/16	09:50	S	E	—			1							✓					✓		
AOC10B0302	7/16	09:55	S	E	—			1							✓					✓		
AOC10B0400	7/16	10:10	S	E	—			1							✓					✓		
AOC10B0402	7/16	10:20	S	E	—			1							✓					✓		

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E. J. Kleinfelter	Date: 7/17/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1200	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/17/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1200	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051492

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRON. 420 ROUSER RD. CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/264-2098
Airbill No.: 818028326987 1/16/65		Sampling complete? Y or N (see Note 1)
Sampler Name: D. SCHILLING	Sampler Signature:	Project-specific (PS) or Batch (B) QC ?

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other_____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other_____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other_____; T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
AOC10B06000	7/16	10:33	S	E	—			1							✓					✓		
AOC10B06021	7/16	10:44	S	E	—			1							✓					✓		
AOC10B05000	7/16	12:16	S	E	—			1							✓					✓		
AOC10B05031	7/16	12:29	S	E	—			1							✓					✓		
AOC10B09000	7/16	11:27	S	E	—			1							✓					✓		
AOC10A09000	7/16	11:27	S	E	—			1	DUP						✓					✓		DUPLICATE
AOC10B09011	7/16	11:31	S	E	—			1							✓					✓		
AOC10B12000	7/16	13:29	S	E	—			1							✓					✓		
AOC10B12011	7/16	13:39	S	E	—			1							✓					✓		
AOC10A12011	7/16	13:35	S	E	—			1	DUP						✓					✓		DUPLICATE

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E.J. Klimczak Date: 7/17/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1700	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) FED EX Date: 7/17/00	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time: 1700	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051495

Project Name : MCB CLEJ BACKGROUND STUDY	Client Address : BAKER ENVIRON 420 ROUSER RD. CORAOPOLIS, PA. 15108	Point-of-Contact : JIM CULP
Carrier : FED EX		Telephone No. : 412/269-2098
Airbill No. : 880283269871/76/65		Sampling complete? (Y) or N (see Note 1)
Sampler Name : D. SCHILLING	Sampler Signature : EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other_____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other_____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other_____
T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		
AOC10B0700	7/16	12:49	S	E	—			1							✓					✓		
AOC10B0703	7/16	12:54	S	E	—			1							✓					✓		
AOC10B0800	7/16	11:14	S	E	—			1							✓					✓		
AOC10B0801	7/16	11:16	S	E	—			1							✓					✓		
AOC10B1000	7/16	11:59	S	E	—			1							✓					✓		
AOC10B1003	7/16	12:07	S	E	—			1							✓					✓		
AOC10B1100	7/16	11:45	S	E	—			1							✓					✓		
AOC10B1101	7/16	11:50	S	E	—			1							✓					✓		
AOC10B1300	7/16	13:47	S	E	—			1							✓					✓		
AOC10B1301	7/16	13:53	S	E	—			1							✓					✓		

PAGE 3 of 4

Remarks / Comments (see Notes 2 & 3)

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E.J. Kl	Date: 7/17/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/17/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051494

Project Name: MCB CLST BACKGROUND STUDY	Client Address: BAKER ENVIRON. 420 ROUSER RD. CORAOPOLIS PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/269-2048
Airbill No.: 818028326987/76/65		Sampling complete? (Y) or N (see Note 1)
Sampler Name: D. SCHILLING	Sampler Signature:	Project-specific (PS) or Batch (B) QC ?

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other_____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other_____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other_____; T. TCLP

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Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
AOC10B1400	7/16	13:07	S	E	—			1							✓					✓			
AOC10B1403	7/16	13:15	S	E	—			1							✓					✓			
	/	:																					
	/	:																					
	/	:																					
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Clients Special Instructions:

Temperature _____ °C

Lab: Received In Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) E. J. Schilling	Date: 7/17/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/17/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051410

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRON. 420 ROUSER ROAD CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.: 818028326987/76/65		Sampling complete? (Y or N) (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other____
T. TCLP

PAGE 1 of 3

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
A0C6LG1300	7/14	13:50	S	E	—			1							✓					✓		
A0C6BG1302	7/14	13:56	S	E	—			1							✓					✓		
A0C6BG1100	7/14	14:30	S	E	—			1							✓					✓		
A0C6BG11	7/14	14:44	S	E	—			1							✓					✓		
A0C7BG1200	7/14	15:03	S	E	—			1							✓					✓		
A0C7BG1208	7/14	15:40	S	E	—			1							✓					✓		
A0C7BG0700	7/14	13:43	S	E	—			1							✓					✓		
A0C7BG0708	7/14	14:08	S	E	—			1							✓					✓		
A0C7BG0600	7/14	13:00	S	E	—			1							✓					✓		
A0C7BG0609	7/14	13:29	S	E	—			1							✓					✓		

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) C.J. Kleinhenz	#2 Relinquished By: (Sig)	#3 Relinquished By: (Sig)
Date: 7/17/00	Date:	Date:
Company Name: BAKER	Company Name:	Company Name:
Time: 1700	Time:	Time:
#1 Received By: (Sig) FED EX	#2 Received By: (Sig)	#3 Received By: (Sig)
Date: 7/17/00	Date:	Date:
Company Name:	Company Name:	Company Name:
Time: 1700	Time:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051471

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRON.	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER RD	Telephone No.: 412/269-2098
Airbill No.: 8180283269876/65	CORAOPOLIS, PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ?

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other_____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other_____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other_____; T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
AOC7BG1400	7/14	16:06	S	E	—			1							✓					✓		
AOC7BG1410	7/14	16:37	S	E	—			1							✓					✓		
AOC7BG0800	7/14	17:59	S	E	—			1							✓					✓		
AOC7BG0808	7/14	18:20	S	E	—			1							✓					✓		
AOC7BG1100	7/14	14:31	S	E	—			1							✓					✓		
AOC7BG1106	7/14	14:50	S	E	—			1							✓					✓		
AOC7BG1300	7/14	17:00	S	E	—			1							✓					✓		
AOC7BG1300	7/14	17:00	S	E	—			1	DUP						✓					✓		DUPLICATE
AOC7BG1306	7/14	17:00	S	E	—			1	MS/MSD						✓					✓		MS/MSD
AOC7BG1306	7/14	17:15	S	E	—			1							✓					✓		

PAGE 2 of 3

Clients Special Instructions: Temperature _____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E.J. Klein	#2 Relinquished By: (Sig)	#3 Relinquished By: (Sig)
Date: 7/17/00	Date:	Date:
Company Name: BAKER	Company Name:	Company Name:
Time: 1700	Time:	Time:
#1 Received By: (Sig) FED EX	#2 Received By: (Sig)	#3 Received By: (Sig)
Date: 7/17/00	Date:	Date:
Company Name:	Company Name:	Company Name:
Time: 1700	Time:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051473

Project Name: MCB CLET BACKGROUND STUDY	Client Address: BAKER ENVIRON. 420 ROUSER RD. CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.: 818028326987/76/65		Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature:	Project-specific (PS) or Batch (B) QC? ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH	Remarks / Comments (see Notes 2 & 3)
AOC7BG1500	7/14	17:37	S	E	—			1							✓					✓	
AOC7BG1504	7/14	17:47	S	E	—			1							✓					✓	
AOC7BG0900	7/15	15:45	S	E	—			1							✓					✓	
AOC7BG0900	7/15	15:45	S	E	—			1	DUP						✓					✓	DUPLICATE
AOC7BG0901	7/15	15:50	S	E	—			1							✓					✓	
AOC7BG1000	7/15	15:10	S	E	—			1							✓					✓	
AOC7BG1002	7/15	15:25	S	E	—			1							✓					✓	
AOC6BG1200	7/17	08:05	S	E	—			1							✓					✓	
AOC6BG1203	7/17	08:28	S	E	—			1							✓					✓	
[illegible]																					

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E.J. Klein	Date: 7/17/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/17/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051486

Project Name: MCA CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRON. 420 ROUSER RD. CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.: 818028326987/76/65		Sampling complete? (Y)or N (see Note 1)
Sampler Name: D. SCHILLING	Sampler Signature: ETK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	1. Surface Water	6. Trip Blank	BOX #2	A. HCl + Ice	F. Ice Only	BOX #3	F. Filtered	Box #4	H. High	Box #5	C. CLP 3/90	T. TCLP
	2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other____		U. Unfiltered		M. Medium		S. SW-846	
	3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice				L. Low		W. CWA 600-series	
	4. Rinsate	9. Other____		D. H2SO4 + Ice	I. ZnAc+NaOH + Ice						O. Other____	
	5. Soil / Sediment / Sludge			E. Unpreserved								

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
AOC9BG1200	7/15	11:25	S	E	—			1							✓					✓			PAGE 1 of 4.
AOC9BG1206	7/15	11:47	S	E	—			1							✓					✓			
AOC9BG1100	7/15	10:52	S	E	—			1							✓					✓			
AOC9BG1105	7/15	11:12	S	E	—			1							✓					✓			
AOC9BG0900	7/15	09:03	S	E	—			1							✓					✓			
AOC9BG0907	7/15	09:33	S	E	—			1							✓					✓			
AOC9BG0100	7/15	13:18	S	E	—			1							✓					✓			
AOC9BG0105	7/15	13:38	S	E	—			1							✓					✓			
AOC9BG0400	7/15	13:50	S	E	—			1							✓					✓			
AOC9BG0411	7/15	14:35	S	E	—			1							✓					✓			

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) E. K. Klein	Date: 7/17/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/17/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051487

Project Name: MCB CLEJ Background Study	Client Address: Baker Environ 420 Rouser Rd. Coraopolis, PA 15108	Point-of-Contact: Jim Culp
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.: 818028326987/76/65		Sampling complete? Y or N (see Note 1)
Sampler Name: D. Schilling	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
A0C9BG0600	7/15	14:54	S	E	—			1							✓					✓		
A0C9BG0608	7/15	15:24	S	E	—			1							✓					✓		
A0C9BG1300	7/15	08:16	S	E				1							✓					✓		
A0C9BG1308	7/15	08:53	S	E	—			1							✓					✓		
A0C9BG0800	7/15	10:17	S	E	—			1							✓					✓		
A0C9BG0806	7/15	10:36	S	E	—			1							✓					✓		
A0C9BG0500	7/15	12:08	S	E	—			1							✓					✓		
A0C9BG0508	7/15	12:40	S	E	—			1							✓					✓		
A0C9BG0700	7/15	15:36	S	E	—			1							✓					✓		
A0C9BG0707	7/15	15:55	S	E	—			1							✓					✓		

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E.J. Kleinhuf	#2 Relinquished By: (Sig)	#3 Relinquished By: (Sig)
Date: 7/17/00	Date:	Date:
Company Name: Baker	Company Name:	Company Name:
Time: 1700	Time:	Time:
#1 Received By: (Sig) FED EX	#2 Received By: (Sig)	#3 Received By: (Sig)
Date: 7/17/00	Date:	Date:
Company Name:	Company Name:	Company Name:
Time: 17 00	Time:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051488

Project Name : MCB CLEJ BACKGROUND STUDY	Client Address : BAKER ENVIRON. 420 ROUSER RD. CORAOPOLIS, PA 15108	Point-of-Contact : JIM CULP
Carrier : FED EX		Telephone No. : 412/269-2098
Airbill No. : 818028326987 7/16/65		Sampling complete? (Y) or N (see Note 1)
Sampler Name : D. SCHILLING	Sampler Signature : EJC	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	1. Surface Water	6. Trip Blank	BOX #2	A. HCl + Ice	F. Ice Only	BOX #3	F. Filtered	Box #4	H. High	Box #5	C. CLP 3/90	T. TCLP
	2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other____		U. Unfiltered		M. Medium		S. SW-846	
	3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice				L. Low		W. CWA 600-series	
	4. Rinsate	9. Other____		D. H2SO4 + Ice	I. ZnAc+NaOH + Ice						O. Other____	
	5. Soil / Sediment / Sludge			E. Unpreserved								

PAGE 3 of 4

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		Remarks / Comments (see Notes 2 & 3)
AOC9BG1000	7/15	09:45	S	E	—			1							✓				✓	
AOC9BG1007	7/15	10:05	S	E	—			1							✓				✓	
AOC9BG1007	7/15	10:05	S	E	—			1	DUP						✓				✓	DUPLICATE
AOC9BG1400	7/15	16:05	S	E	—			1							✓				✓	
AOC9BG1400	7/15	16:05	S	E	—			1	DUP						✓				✓	DUPLICATE
AOC9BG1400	7/15	16:05	S	E	—			1	MS/MSD						✓				✓	MS/MSD
AOC9BG1407	7/15	16:20	S	E	—			1							✓				✓	
AOC9BG0300	7/16	09:00	S	E	—			1							✓				✓	
AOC9BG0308	7/16	09:23	S	E	—			1							✓				✓	
AOC9BG0308	7/16	:	S	E	—			1	DUP						✓				✓	DUPLICATE

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E.J. Kleinhenz	Date: 7/17/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/17/01	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051516

Project Name: MCA CLGT BACKGROUND STUDY	Client Address: BAKER ENVIRON	Point-of-Contact: TIM CULP
Carrier: FED EX	420 KOUSER ROAD	Telephone No.: 412/269-2098
Airbill No.: 819028326987/96/63	CORAOPOLIS, PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH			pH	Remarks / Comments (see Notes 2 & 3)
AOC9AG0200	7/17	09:49	S	E	—			1							✓						J	
AOC9BG0203	7/17	09:58	S	E	—			1							✓						J	
	/	:																				
	/	:																				
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Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) EJK Date: 7/17/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1700	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) FED EX Date: 7/17/00	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time: 1700	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge.
Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051489

Project Name : MCB CLEJ BACKGROUND STUDY	Client Address : BAKER ENVIRON. 420 ROUSER RD. CORAOPOLIS, PA 15108	Point-of-Contact : JIM CULP
Carrier : FED EX		Telephone No. : 412/269-2098
Airbill No. : 818028326987/76/65		Sampling complete? (Y) or N (see Note 1)
Sampler Name : N. BARTA	Sampler Signature : NJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	1. Surface Water	6. Trip Blank	BOX #2	A. HCl + Ice	F. Ice Only	BOX #3	F. Filtered	Box #4	H. High	Box #5	C. CLP 3/90	T. TCLP
	2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other____		U. Unfiltered		M. Medium		S. SW-846	
	3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice				L. Low		W. CWA 600-series	
	4. Rinsate	9. Other____		D. H2SO4 + Ice	I. ZnAc+NaOH + Ice						O. Other____	
	5. Soil / Sediment / Sludge			E. Unpreserved								

PAGE 1 of 4

Sample ID (9 characters maximum)	Date: Year:	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		1,2 H		Remarks / Comments (see Notes 2 & 3)
AOC11B010000	7/16	12:46	S	E	—			1							✓					✓		
AOC11B010101	7/16	12:49	S	E	—			1							✓					✓		
AOC11B020000	7/16	12:25	S	E	—			1							✓					✓		
AOC11B020101	7/16	12:31	S	E	—			1							✓					✓		
AOC11B030000	7/16	12:04	S	E	—			1							✓					✓		
AOC11B030101	7/16	12:10	S	E	—			1							✓					✓		
AOC11B040000	7/16	11:10	S	E	—			1							✓					✓		
AOC11B040202	7/16	11:18	S	E	—			1							✓					✓		
AOC11B040202	7/16	11:18	S	E	—			1	DUP						✓					✓		DUPLICATE
AOC11B050000	7/16	10:20	S	E	—			1							✓					✓		

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) P. J. Kleinfelter	Date: 7/17/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/17/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051490

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIROD. 420 ROUSER RD CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.:
Airbill No.: 818028726987/76/6		Sampling complete? (Y or N) (see Note 1)
Sampler Name: N. HARTM	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ?

BOX #1	1. Surface Water	6. Trip Blank	BOX #2	A. HCl + Ice	F. Ice Only	BOX #3	F. Filtered	Box #4	H. High
	2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other_____		U. Unfiltered		M. Medium
	3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice				L. Low
	4. Rinsate	9. Other_____		D. H2SO4 + Ice	I. ZnAc+NaOH + Ice				
	5. Soil / Sediment / Sludge			E. Unpreserved					

Box #5		
C. CLP 3/90		T. TCLP
S. SW-846		
W. CWA 600-series		
O. Other_____		

Sample ID (9 characters maximum)	Date: Year 2006	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
AOC11B05001	7/16	10:24	S	E	—			1							✓					✓		PAGE 2 of 4
AOC11B06000	7/16	09:55	S	E	—			1							✓					✓		
AOC11B06001	7/16	09:58	S	E	—			1							✓					✓		
AOC11B07000	7/16	11:40	S	E	—			1							✓					✓		
AOC11B07001	7/16	11:44	S	E	—			1							✓					✓		
AOC11B08000	7/16	10:26	S	E	—			1							✓					✓		
AOC11B08002	7/16	10:40	S	E	—			1							✓					✓		
AOC11B09000	7/16	08:40	S	E	—			1							✓					✓		
AOC11B09001	7/16	08:46	S	E	—			1							✓					✓		
AOC11B09001	7/16	08:46	S	E	—			1	MS/MSD						✓					✓		MS/MSD

Clients Special Instructions: Temperature _____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E. J. Klein	Date: 7/17/06	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/17/06	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051493

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRON. 420 ROUSER RD. CORAOPOLIS, PA 15108	Point-of-Contact: Jim Culp
Carrier: FED EX		Telephone No.: 412/264-2080
Airbill No.: 8180283269876/16/65		Sampling complete? Y or N (see Note 1)
Sampler Name: D Sanders	Sampler Signature:	Project-specific (PS) or Batch (B) QC?

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other_____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other_____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other_____; T. TCLP

Sample ID (9 characters maximum)	Date: Year	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
AOC11B1000	7/16	09:32	S	E	—			1							✓					✓			
AOC11B1001	7/16	09:36	S	E	—			1							✓					✓			
AOC11B1300	7/16	08:56	S	E	—			1							✓					✓			
AOC11B1302	7/16	09:01	S	E	—			1							✓					✓			
AOC11B1400	7/16	08:13	S	E	—			1							✓					✓			
AOC11B1400	7/16	08:13	S	E	—			1	DUP						✓					✓			DUPLICATE
AOC11B1402	7/16	08:25	S	E	—			1							✓					✓			
AOC11B1402	7/16	08:25	S	E	—			1	MS/MSD						✓					✓			MS/MSD
	/	:																					
	/	:																					

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E.J. Klein Jr.	#2 Relinquished By: (Sig)	#3 Relinquished By: (Sig)
Date: 7/17/00	Date:	Date:
Company Name: BAKER	Company Name:	Company Name:
Time: 1700	Time:	Time:
#1 Received By: (Sig) FED EX	#2 Received By: (Sig)	#3 Received By: (Sig)
Date: 7/17/00	Date:	Date:
Company Name:	Company Name:	Company Name:
Time: 17011	Time:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051517

Project Name: MCA CLEF BACKGROUND STUDY	Client Address: BAKER ENVIRON. 420 ROUSER RD. CORAOPOLIS PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.: 818028326987/76/65		Sampling complete? Y or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: E.J.C	Project-specific (PS) or Batch (B) QC ?

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other_____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other_____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other_____
T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Pb-1		Remarks / Comments (see Notes 2 & 3)
																					PAGE 4 of 4
AOC11B1100	7/17	10:05	S	E	—			1							✓				✓		
AOC11B1101	7/17	10:10	S	E	—			1							✓				✓		
AOC11B1101	7/17	10:10	S	E	—			1	DUP						✓				✓		DUPLICATE
AOC11B1200	7/17	10:30	S	E	—			1							✓				✓		
AOC11B1202	7/17	10:41	S	E	—			1							✓				✓		
AOC11B1202	7/17	10:41	S	E	—			1							✓				✓		
	/	:																			
	/	:																			
	/	:																			
	/	:																			

Clients Special Instructions:

Temperature _____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E.J. Kleinfelter	Date: 7/17/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/17/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 051453

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENV. 420 ROUSER RD CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.: 818028327001		Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other____
T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
A0C3BG0100	7/12	10:09	S	E	—			1							✓					✓		
A0C3BG0106	7/12	10:09	S	E	—			1	DUP						✓					✓		DUPLICATE
A0C3BG0103	7/12	10:12	S	E	—			1							✓					✓		
A0C3BG0200	7/12	10:35	S	E	—			1							✓					✓		
A0C3BG0205	7/12	10:42	S	E	—			1							✓					✓		
A0C3BG0400	7/12	11:35	S	E	—			1							✓					✓		
A0C3BG0407	7/12	11:57	S	E	—			1							✓					✓		
A0C3BG0500	7/12	11:00	S	E	—			1							✓					✓		
A0C3BG0505	7/12	11:15	S	E	—			1							✓					✓		
A0C3BG0700	7/12	13:05	S	E	—			1							✓					✓		

PAGE 1 of 14

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E.J. Klein	Date: 7/14/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/14/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. ___

Project Name : MCB CLEET BACKGROUND STUDY	Client Address : BAKER ENV.	Point-of-Contact : JIM CULP
Carrier : FED EX	420 ROUSER RD	Telephone No. : 412/269-2098
Airbill No. : 818028327001	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name : VARIOUS	Sampler Signature : EJK	Project-specific (PS) or Batch (B) QC ? ___

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other_____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other_____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other_____
T. TCLP

Sample ID (9 characters maximum)	Date:Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
AOC4BG0711	7/12	13:56	S	E	—			1							✓					✓		PAGE 2 of 14
AOC3BG1000	7/12	09:40	S	E	—			1							✓					✓		
AOC3BG1004	7/12	09:50	S	E	—			1							✓					✓		
AOC3BG1100	7/12	09:05	S	E	—			1							✓					✓		
AOC3BG1105	7/12	09:25	S	E	—			1							✓					✓		
AOC3BG1200	7/12	08:15	S	E	—			1							✓					✓		
AOC3BG1205	7/12	08:40	S	E	—			1							✓					✓		
AOC3BG1205	7/12	08:40	S	E	—			1	DUP						✓					✓		DUPLICATE
AOC3BG0600	7/12	12:00	S	E	—			1							✓					✓		
AOC3BG0606	7/12	12:20	S	E	—			1							✓					✓		

Clients Special Instructions: Temperature ___ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E.J. Kluck	Date: 7/14/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/14/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge.
Note (3): All lab copies of data destroyed after three years.

CHAIN-OF-CUSTODY RECORD

No. [illegible]

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Project Name: MCA CLET BACKGROUND STUDY	Client Address: BAKER ENVIR.	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER ROAD	Telephone No.: 412/269-2098
Airbill No.: 818028327001	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC? ____

BOX #1	1. Surface Water	6. Trip Blank	
	2. Ground Water	7. Oil	
	3. Leachate	8. Waste	
	4. Rinsate	9. Other____	
	5. Soil / Sediment / Sludge		
BOX #2	A. HCl + Ice	F. Ice Only	
	B. HNO3 + Ice	G. Other____	
	C. NaOH + Ice	H. NaHSO4 + Ice	
	D. H2SO4 + Ice	I. ZnAc+NaOH + Ice	
	E. Unpreserved		
BOX #3	F. Filtered		
	U. Unfiltered		
Box #4	H. High		
	M. Medium		
	L. Low		
Box #5	C. CLP 3/90	T. TCLP	
	S. SW-846		
	W. CWA 600-series		
	O. Other____		

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
																							PAGE 3 of 14
A0C3BG0800	7/12	07:35	S	E	—			1							✓					✓			
A0C3BG0800	7/12	07:35	S	E	—			1	MS/MSD						✓					✓			MS/MSD
A0C3BG0801	7/12	07:45	S	E	—			1							✓					✓			
A0C3BG0300	7/12	10:55	S	E	—			1							✓					✓			
A0C3BG0306	7/12	11:21	S	E	—			1							✓					✓			
A0C3BG0900	7/12	08:39	S	E	—			1							✓					✓			
A0C3BG0906	7/12	09:15	S	E	—			1							✓					✓			
A0C3BG0700	7/12	10:12	S	E	—			1							✓					✓			
A0C3BG0705	7/12	10:35	S	E	—			1							✓					✓			
A0C4BG0200	7/12	13:04	S	E	—			1							✓					✓			

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E. J. Klein	Date: 7/14/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/14/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. [illegible]

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRONMENTAL	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER ROAD	Telephone No.: 412/269-2098
Airbill No.: 818028327001	CORAOPOLIS, PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

PAGE 4 of 14

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
A0C4BG0200	7/12	13:04	S	E	—			1	MS/MSD						✓					✓		MS/MSD
A0C4BG0207	7/12	13:45	S	E	—			1							✓					✓		
A0C4BG0300	7/12	16:48	S	E	—			1							✓					✓		
A0C4BG0306	7/12	17:30	S	E	—			1							✓					✓		
A0C4BG0100	7/12	14:12	S	E	—			1							✓					✓		
A0C4BG0104	7/12	14:40	S	E	—			1							✓					✓		
A0C4BG0400	7/12	15:15	S	E	—			1							✓					✓		
A0C4BG0407	7/12	16:05	S	E	—			1							✓					✓		
A0C4BG0800	7/12	16:37	S	E	—			1							✓					✓		
A0C4BG0809	7/12	17:05	S	E	—			1							✓					✓		

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E. J. Kleinfelter	Date: 7/14/00	#2 Relinquished By: (Sig) / Date: /	#3 Relinquished By: (Sig) / Date:
Company Name: BAKER	Time: 1700	Company Name: / Time:	Company Name: / Time:
#1 Received By: (Sig) FED EX	Date: 7/14/00	#2 Received By: (Sig) / Date:	#3 Received By: (Sig) / Date:
Company Name:	Time: 1700	Company Name: / Time:	Company Name: / Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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501 Madison Avenue
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CHAIN-OF-CUSTODY RECORD

No. 0014

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRONMENTAL 420 ROUSER ROAD CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.: 818028327001		Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJIC	Project-specific (PS) or Batch (B) QC? ____

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other____
T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
A0C4BG1000	7/12	15:42	5	E	—			1							✓					✓			
A0C4BG1010	7/12	16:20	5	E	—			1							✓					✓			
A0C4BG0900	7/12	17:15	5	E	—			1							✓					✓			
A0C4BG0900	7/12	17:15	5	E	—			1	DUP						✓					✓			DUPLICATE
A0C4BG0908	7/12	17:40	5	E	—			1							✓					✓			
A0C4BG0600	7/12	14:10	5	E	—			1							✓					✓			
A0C4BG0608	7/12	19:40	5	E	—			1							✓					✓			
A0C4BG0608	7/12	14:40	5	E	—			1	DUP						✓					✓			DUPLICATE
A0C4BG0611	7/12	15:30	5	E	—			1							✓					✓			
A0C4BG0611	7/12	15:30	5	E	—			1	DUP						✓					✓			DUPLICATE

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E. Klein	Date: 7/19/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/19/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

CHAIN-OF-CUSTODY RECORD

No. 001401

CompuChem
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Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENV.	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER RD	Telephone No.: 412/269-2098
Airbill No.: 818028327001	CORAOPOLIS, PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

PAGE 6 of 14

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
A0C5BG0500	7/13	07:52	5	E	—			1							✓					✓		
A0C5BG0506	7/13	08:20	5	E	—			1							✓					✓		
A0C5BG0506	7/13	08:20	5	E	—			1	DUP						✓					✓		DUPLICATE
A0C5BG0600	7/13	08:37	5	E	—			1							✓					✓		
A0C5BG0604	7/13	08:55	5	E	—			1							✓					✓		
A0C5BG0700	7/13	09:11	5	E	—			1							✓					✓		
A0C5BG0706	7/13	09:33	5	E	—			1							✓					✓		
A0C5BG0800	7/13	09:48	5	E	—			1							✓					✓		
A0C5BG0802	7/13	09:55	5	E	—			1							✓					✓		
A0C5BG1000	7/13	10:12	5	E	—			1							✓					✓		

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) Ed. Klein	Date: 7/14/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/14/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; If "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. [illegible]

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENV.	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER RD	Telephone No.: 412/269-2098
Airbill No.: 818028327001	CORAOPOLIS, PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2 A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3 F. Filtered; U. Unfiltered

Box #4 H. High; M. Medium; L. Low

Box #5 C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
A0C5BG1005	7/13	10:30	S	E	—			1							✓					✓			
A0C5BG0900	7/13	10:56	S	E	—			1							✓					✓			
A0C5BG0900	7/13	10:56	S	E	—			1	Dup						✓					✓			DUPLICATE
A0C5BG0903	7/13	11:06	S	E	—			1							✓					✓			
A0C5BG1500	7/13	11:33	S	E	—			1							✓					✓			
A0C5BG1503	7/13	11:37	S	E	—			1							✓					✓			
A0C4BG0500	7/13	09:46	S	E	—			1							✓					✓			
A0C4BG0503	7/13	10:00	S	E	—			1							✓					✓			
A0C4AG0503	7/13	10:00	S	E	—			1	Dup						✓					✓			Duplicate
A0C4BG1103	7/13	10:50	S	E	—			1							✓					✓			

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E.J. Klein	Date: 7/14/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/14/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

CHAIN-OF-CUSTODY RECORD

No. [illegible]

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Project Name: MCB CLEF BACKGROUND STUDY	Client Address: BAKER ENV.	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER ROAD	Telephone No.: 412/269-2098
Airbill No.:	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: ETK	Project-specific (PS) or Batch (B) QC ?

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other_____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other_____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other_____; T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
A0C4BG1100	7/13	10:28	S	E	—			1	MS/MSD						✓					✓		MS/MSD
A0C4BG1100	7/13	10:28	S	E	—			1							✓					✓		
A0C4BG1200	7/13	11:22	S	E	—			1							✓					✓		
A0C4BG1204	7/13	11:55	S	E	—			1							✓					✓		
A0C4BG1300	7/13	12:44	S	E	—			1							✓					✓		
A0C4BG1305	7/13	13:15	S	E	—			1							✓					✓		
A0C4BG1400	7/13	08:15	S	E	—			1							✓					✓		
A0C4BG1409	7/13	09:10	S	E	—			1							✓					✓		
A0C5BG0100	7/13	17:28	S	E	—			1							✓					✓		
A0C5BG0168	7/13	18:13	S	E	—			1							✓					✓		

Clients Special Instructions:

Temperature _____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E.J. Klein	Date: 7/14/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/14/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. [illegible]

Project Name: MCB CLEF BACKGROUND STUDY	Client Address: BAKER ENV. 420 ROUSER RD CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.:		Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ?

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other_____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other_____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other_____
T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
AOC5BG02 00	7/13	14:55	S	E	—			1							✓					✓			PAGE 9 of 14
AOC5BG02 09	7/13	15:42	S	E	—			1							✓					✓			
AOC5BG03 00	7/13	13:55	S	E	—			1							✓					✓			
AOC5BG03 00	7/13	13:55	S	E	—			1	Dup						✓					✓			Duplicate
AOC5BG03 05	7/13	14:25	S	E	—			1							✓					✓			
AOC5BG03 05	7/13	14:25	S	E	—			1	MS/MSD						✓					✓			MS/MSD
AOC5BG04 00	7/13	16:20	S	E	—			1							✓					✓			
AOC5BG04 08	7/13	17:00	S	E	—			1							✓					✓			
AOC5BG11 00	7/13	14:20	S	E	—			1							✓					✓			
AOC5BG11 05	7/13	14:40	S	E	—			1							✓					✓			

Clients Special Instructions:

Lab: Received in Good Condition? Y or N **Describe Problems, if any:** Temperature _____ °C

#1 Relinquished By: (Sig) E.J. Klink	Date: 7/14/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/14/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. [illegible]

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENV.	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER ROAD	Telephone No.: 412/269-2098
Airbill No.:	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other____
T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
A0C5BG1200	7113	13:53	5	E	—			1							✓					✓		
A0C5BG1204	7113	14:04	5	E	—			1							✓					✓		
A0C5BG1204	7113	14:04	5	E	—			1	DUP						✓					✓		Duplicate
A0C5BG1204	7113	14:04	5	E	—			1	MS/MSD						✓					✓		MS/MSD
A0C5BG1300	7113	13:20	5	E	—			1							✓					✓		
A0C5BG1305	7113	13:37	5	E	—			1							✓					✓		
A0C5BG1400	7113	12:12	5	E	—			1							✓					✓		
A0C5BG1403	7113	12:33	5	E	—			1							✓					✓		
A0C5BG1600	7113	12:47	5	E	—			1							✓					✓		
A0C5BG1604	7113	13:03	5	E	—			1							✓					✓		

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E.A. Klein	Date: 7/14/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER	Time: 1700	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) FED EX	Date: 7/14/00	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name:	Time: 1700	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

CHAIN-OF-CUSTODY RECORD

No. [illegible]

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Project Name: MCB CLET BACKGROUND STUDY	Client Address: BAKER ENVIR. 420 ROUSER RD. CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.:		Sampling complete? (Y or N) (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other_____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other_____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other_____
T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
A0C6BG0500	7113	15:00	5	E	—			1							✓					✓			
A0C6BG0504	7113	15:16	5	E	—			1							✓					✓			
A0C6BG0600	7113	16:17	5	E	—			1							✓					✓			
A0C6BG0604	7113	16:28	5	E	—			1							✓					✓			
A0C6BG0700	7113	15:31	5	E	—			1							✓					✓			
A0C6BG0705	7113	15:43	5	E	—			1							✓					✓			
A0C6BG0800	7113	17:51	5	E	—			1							✓					✓			
A0C6BG0804	7113	18:06	5	E	—			1							✓					✓			
A0C6BG0900	7113	17:17	5	E	—			1							✓					✓			
A0C6BG0900	7113	17:17	5	E	—			1	Dup						✓					✓			Duplicate

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E.J. Kleinfelter	Date: 7/14/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/14/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 00[illegible]

Project Name : MCB CLEJ BACKGROUND STUDY	Client Address : BAKER ENVIRON.	Point-of-Contact : JIM CULP
Carrier : FED EX	420 ROUSER ROAD	Telephone No. : 412/269-2098
Airbill No. :	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name : VARIOUS	Sampler Signature : EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2 A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3 F. Filtered; U. Unfiltered

Box #4 H. High; M. Medium; L. Low

Box #5 C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
AOC6BG0904	7/13	17:40	5	E	—			1							✓					✓			
AOC6BG1000	7/13	16:44	5	E	—			1							✓					✓			
AOC6BG1006	7/13	17:07	5	E	—			1							✓					✓			
AOC6BG0400	7/14	11:43	5	E	—			1							✓					✓			
AOC6BG04??	7/14	12:25	5	E	—			1							✓					✓			
AOC6BG0200	7/14	09:05	5	E	—			1							✓					✓			
AOC6BG0209	7/14	10:00	5	E	—			1							✓					✓			
AOC6BG0309	7/14	11:18	5	E	—			1							✓					✓			
AOC6BG0300	7/14	10:30	5	E	—			1							✓					✓			
AOC6BG0100	7/14	09:55	5	E	—			1							✓					✓			

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E. J. Klein Date: 7/14/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1700	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) FED EX Date: 7/14/00	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time: 1700	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 00112

Project Name : MCB CLEJ BACKGROUND STUDY	Client Address : BAKER ENVIRON.	Point-of-Contact : JIM CULP
Carrier : FED EX	420 ROUSER RD.	Telephone No. : 412/269-2098
Airbill No. :	CORAOPOLIS, PA 15108	Sampling complete? (Y or N (see Note 1)
Sampler Name : VARIOUS	Sampler Signature : EJK	Project-specific (PS) or Batch (B) QC ?

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other_____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other_____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other_____; T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
A0C6BG0100	7/14	07:55	S	E	—			1	DUP						✓					✓			DUPLICATE
A0C6BG0106	7/14	08:31	S	E	—			1							✓					✓			
A0C6BG0106	7/14	08:31	S	E	—			1	MS/MSD						✓					✓			MS/MSD
A0C5BG1700	7/14	08:07	S	E	—			1							✓					✓			
A0C5BG1703	7/14	08:21	S	E	—			1							✓					✓			
A0C7BG1600	7/14	08:40	S	E	—			1							✓					✓			
A0C7BG1606	7/14	08:56	S	E	—			1							✓					✓			
A0C7BG0504	7/14	R:16	S	E	—			1							✓					✓			
A0C7BG0500	7/14	11:51	S	E	—			1							✓					✓			
A0C7BG0300	7/14	10:45	S	E	—			1							✓					✓			

Clients Special Instructions: Temperature _____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E.J. Klein Jr. Date: 7/14/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1700	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) FED EX Date: 7/14/00	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time: 1700	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. [illegible]

Project Name : MCB CUB J BACKGROUND STUDY	Client Address : BAKER ENVIRON. 420 ROUSER ROAD CORAOPOLIS, PA 15108	Point-of-Contact : JIM CULP
Carrier : FED EX		Telephone No. : 412/269-2098
Airbill No. :		Sampling complete? Y or N (see Note 1)
Sampler Name : various	Sampler Signature : GJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2 A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3 F. Filtered; U. Unfiltered

Box #4 H. High; M. Medium; L. Low

Box #5 C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date:Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
AOC7BG0305	7/14	11:03	S	E	—			1							✓					✓			
AOC7BG0200	7/14	10:05	S	E	—			1							✓					✓			
AOC7BG0202	7/14	10:15	S	E	—			1							✓					✓			
AOC7BG0202	7/14	10:15	S	E	—			1	DUP						✓					✓			DUPLICATE
AOC7BG0403	7/14	11:30	S	E	—			1							✓					✓			
AOC7BG0400	7/14	11:17	S	E	—			1							✓					✓			
AOC7BG0100	7/14	09:10	S	E	—			1							✓					✓			
AOC7BG0107	7/14	09:40	S	E	—			1							✓					✓			
[illegible]	7/	:	S	E				1							✓					✓			GJK 7/14/00
[illegible]	7/	:	S	E				1							✓					✓			GJK 7/14/00

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) G.J. Klein	Date: 7/14/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/14/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 0014 2

Project Name : MCB CLEJ BACKGROUND STUDY	Client Address : BAKER ENV.	Point-of-Contact : JIM CULP
Carrier : FED EX	420 ROUSER ROAD	Telephone No. : 412/269-2098
Airbill No. :	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name : VARIOUS	Sampler Signature : EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2 A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3 F. Filtered; ~~U. Unfiltered~~

Box #4 H. High; M. Medium; L. Low

Box #5 C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH			Remarks / Comments (see Notes 2 & 3)
BASEBG0200	7/13	07:40	S	E	—			1							✓					✓			
BASEBG0203	7/13	08:03	S	E	—			1							✓					✓			
BASEBG2900	7/12	15:00	S	E	—			1							✓					✓			
BASEBG2902	7/12	15:15	S	E	—			1							✓					✓			
BASEBG0600	7/13	10:10	S	E	—			1							✓					✓			
BASEBG0605	7/13	10:45	S	E	—			1							✓					✓			
BASEBG2400	7/12	14:05	S	E	—			1							✓					✓			
BASEBG2901	7/12	14:15	S	E	—			1							✓					✓			
BASEBG4600	7/13	16:25	S	E	—			1							✓					✓			
BASEBG4602	7/13	16:30	S	E	—			1							✓					✓			

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E.J. Klein Date: 7/14/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1700	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) FED EX Date: 7/19/00	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time: 1700	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. [illegible]

Project Name : MCB CLEJ BACKGROUND STUDY	Client Address : BAKER ENVIRONMENTAL	Point-of-Contact : JIM CULP
Carrier : FED EX	420 ROUSER ROAD	Telephone No. : 412/296-2098
Airbill No. : 818028327012	CORAOPOLIS, PA 15108	Sampling complete? (Y) N (see Note 1)
Sampler Name : VARIOUS	Sampler Signature : EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	1. Surface Water	6. Trip Blank	BOX #2	A. HCl + Ice	F. Ice Only	BOX #3	F. Filtered	Box #4	H. High
	2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other____		U. Unfiltered		M. Medium
	3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice				L. Low
	4. Rinsate	9. Other____		D. H2SO4 + Ice	I. ZnAc+NaOH + Ice			Box #5	C. CLP 3/90 T. TCLP
	5. Soil / Sediment / Sludge			E. Unpreserved					S. SW-846
									W. CWA 600-series
									O. Other____

Sample ID (9 characters maximum)	Date:Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH					Remarks / Comments (see Notes 2 & 3)
AOC1BG0100	07/11	13:50	S	E	—			1							✓								
AOC1BG0102	07/11	14:00	S	E	—			1							✓								
AOC1BG0200	07/11	09:23	S	E	—			1							✓								
AOC1BG0204	07/11	10:15	S	E	—			1							✓								
AOC1BG0300	07/11	12:21	S	E	—			1							✓								
AOC1BG0304	07/11	12:40	S	E	—			1							✓								
AOC1BG0400	07/11	11:46	S	E	—			1							✓	✓							
AOC1BG0404	07/11	12:08	S	E	—			1							✓								
AOC1BG0500	07/11	10:15	S	E	—			1							✓								
AOC1BG0502	07/11	10:23	S	E	—			1							✓								

PAGE 1 of 11

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E.J. Klein	Date: 7/12/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/12/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. [illegible]

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRON. 420 ROUSER ROAD CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/269-2098
Airbill No.: 818028327012		Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC? ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
AOC1BG0600	7/11	09:00	S	E	—			1							✓				PAGE 2 of 11
AOC1BG0604	7/11	09:15	S	E	—			1							✓				
AOC1BG0700	7/11	13:27	S	E	—			1							✓				
AOC1BG0704	7/11	13:44	S	E	—			1							✓				
AOC1BG0800	7/11	13:05	S	E	—			1							✓				
AOC1BG0802	7/11	13:10	S	E	—			1							✓				
AOC1BG0900	7/11	12:20	S	E	—			1							✓				
AOC1BG0901	7/11	12:30	S	E	—			1							✓				
AOC1BG1000	7/11	20:10	S	E	—			1							✓				
AOC1BG1001	7/11	20:10	S	E	—			1	DUP						✓				DUPLICATE

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E.J. Kleinfelter Date: 7/12/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1700	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) FED EX Date: 7/12/00	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time: 1700	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 00174

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRONMENTAL	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER ROAD	Telephone No.: 412/269-2098
Airbill No.: 818028327012	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC? ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
AOC1BG1001	7/11	20:15	S	E	—			1							✓				1
AOC1BG1001	7/11	20:15	S	E	—			1	DUP						✓				DUPLICATE
AOC1BG1001	7/11	20:15	S	E	—			1	MS/MSD						✓				MS/MSD
AOC1BG1100	7/11	09:40	S	E	—			1							✓				
AOC1BG1102	7/11	09:45	S	E	—			1							✓				
AOC1BG1200	7/11	10:55	S	E	—			1							✓				
AOC1BG1200	7/11	10:55	S	E	—			1	DUP						✓				DUPLICATE
AOC1BG1200	7/11	10:55	S	E	—			1	MS/MSD						✓				MS/MSD
AOC1BG1202	7/11	11:05	S	E	—			1							✓				
AOC1BG1300	7/11	13:00	S	E	—			1							✓				

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Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) E.J. Klink	Date: 7/12/01	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1760	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/12/01	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1760	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 00114

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRONMENTAL	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER ROAD	Telephone No.: 412/269-2098
Airbill No.: 818028327012	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ?

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other_____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other_____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other_____
T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
A0C1BG1301	7/11	13:05	5	E	—			1							✓				
A0C1BG1400	7/11	10:40	5	E	—			1							✓				
A0C1BG1403	7/11	10:45	5	E	—			1							✓				
A0C1BG1500	7/11	11:09	5	E	—			1							✓				
A0C1BG1503	7/11	11:20	5	E	—			1							✓				
A0C2BG0100	7/11	18:45	5	E	—			1							✓				
A0C2BG0101	7/11	18:55	5	E	—			1							✓				
A0C2BG0200	7/11	18:10	5	E	—			1							✓				
A0C2BG0200	7/11	18:10	5	E	—			1	DUP						✓				DUPLICATE
A0C2BG0201	7/11	18:15	5	E	—			1							✓				

Clients Special Instructions:

Temperature _____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E.J. Klink	Date: 7/12/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/12/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 00514 5

Project Name : MCA CLEJ BACKGROUND STUDY	Client Address : BAKER ENVIRONMENTAL	Point-of-Contact : JIM CULP
Carrier : FED EX	420 ROUSER RD.	Telephone No. : 412/269-2098
Airbill No. : 818028327012	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name : VARIOUS	Sampler Signature : EJK	Project-specific (PS) or Batch (B) QC ? ____

BOX #1	1. Surface Water	6. Trip Blank	BOX #2	A. HCl + Ice	F. Ice Only	BOX #3	F. Filtered	Box #4	H. High
	2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other____		U. Unfiltered		M. Medium
	3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice				L. Low
	4. Rinsate	9. Other____		D. H2SO4 + Ice	I. ZnAc+NaOH + Ice				
	5. Soil / Sediment / Sludge			E. Unpreserved					

Box #5		
C. CLP 3/90		T. TCLP
S. SW-846		
W. CWA 600-series		
O. Other____		

PAGE 5 of 11

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
A0C2BG0300	7/11	20:09	S	E	—			1							✓				
A0C2BG0300	7/11	20:09	S	E	—			1	DUP						✓				DUPLICATE
A0C2BG0303	7/11	20:25	S	E	—			1							✓				
A0C2BG0400	7/11	19:10	S	E	—			1							✓				
A0C2BG0406	7/11	19:45	S	E	—			1							✓				
A0C2BG0500	7/11	17:15	S	E	—			1							✓				
A0C2BG0502	7/11	17:25	S	E	—			1							✓				
A0C2BG0600	7/11	16:20	S	E	—			1							✓				
A0C2BG0604	7/11	16:50	S	E	—			1							✓				
A0C2BG0604	7/11	16:50	S	E	—			1	DUP						✓				DUPLICATE

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E.J. Klein	Date: 7/12/06	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/12/06	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. UU14.1

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRONMENTAL	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER ROAD	Telephone No.: 412/269-2098
Airbill No.: 818028327012	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC? ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
A0C2BG0604	7/11	16:50	S	E	—			1	MS/MSD						✓				MS/MSD
A0C2BG0700	7/11	15:35	S	E	—			1							✓				
A0C2BG0702	7/11	15:50	S	E	—			1							✓				
A0C2BG0800	7/11	14:45	S	E	—			1							✓				
A0C2BG0800	7/11	14:45	S	E	—			1	DUP						✓				DUPLICATE
A0C2BG0801	7/11	15:03	S	E	—			1							✓				
A0C2BG0900	7/11	14:04	S	E	—			1							✓				
A0C2BG0902	7/11	14:06	S	E	—			1							✓				
A0C2BG1000	7/11	16:04	S	E	—			1							✓				
A0C2BG1002	7/11	16:14	S	E	—			1							✓				

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E. J. Klein	Date: 7/12/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1100	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/12/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 00[illegible]

Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRONMENTAL	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER ROAD	Telephone No.: 412/269-2098
Airbill No.: 8180283270 12	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJIC	Project-specific (PS) or Batch (B) QC ? ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
AOC2BG1100	7/11	15:03	S	E	—			1							✓				
AOC2BG1102	7/11	15:15	S	E	—			1							✓				
AOC2BG1200	7/11	19:30	S	E	—			1							✓				
AOC2BG1202	7/11	19:41	S	E	—			1							✓				
AOC2BG1300	7/11	19:00	S	E	—			1							✓				
AOC2BG1303	7/11	19:13	S	E	—			1							✓				
AOC2BG1400	7/11	15:30	S	E	—			1							✓				
AOC2BG1402	7/11	15:45	S	E	—			1							✓				
AOC2BG1402	7/11	15:45	S	E	—			1	DUP						✓				DUPLICATE
AOC2BG1402	7/11	15:45	S	E	—			1	MS/MSD						✓				MS/MSD

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) [signature]	Date: 7/12/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/12/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

CHAIN-OF-CUSTODY RECORD

No. [illegible]

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Project Name: MCB CLEJ BACKGROUND STUDY	Client Address: BAKER ENVIRONMENTAL	Point-of-Contact: JIM CULP
Carrier: FED EX	420 ROUSER RD	Telephone No.: 412/269-2098
Airbill No.: 818028327012	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJC	Project-specific (PS) or Batch (B) QC ? ____

BOX #1 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2 A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3 F. Filtered; U. Unfiltered

Box #4 H. High; M. Medium; L. Low

Box #5 C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

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Sample ID (9 characters maximum)	Date:Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
A0C2BG1506	7/11	16:34	S	E	—			1							✓				
A0C2BG1503	7/11	16:45	S	E	—			1							✓				
A0C2BG1600	7/11	17:00	S	E	—			1							✓				
A0C2BG1605	7/11	17:15	S	E	—			1							✓				
A0C2BG1700	7/11	17:30	S	E	—			1							✓				
A0C2BG1705	7/11	17:46	S	E	—			1							✓				
A0C2BG1800	7/11	18:00	S	E	—			1							✓				
A0C2BG1804	7/11	18:13	S	E	—			1							✓				
A0C2BG1906	7/11	18:31	S	E	—			1							✓				
A0C2BG1902	7/11	18:40	S	E	—			1							✓				

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) [signature]	Date: 7/12/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/12/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

CHAIN-OF-CUSTODY RECORD

No. 001021

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Project Name: MCB CLST Background Study	Client Address: Baker Environ.	Point-of-Contact: Jim Culp
Carrier: Fed Ex	420 Rouser Road	Telephone No.: 412/269-2098
Airbill No.: 818807832693 2	Coraopolis, PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name: Various	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ?

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other_____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other_____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other_____
T. TCLP

Sample ID (9 characters maximum)	Date: Year: 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH		pH		Remarks / Comments (see Notes 2 & 3)
AOC6BG1400	7/18	17:30	S	E	—			1							✓					✓		
AOC6AG1403	7/18	17:44	S	E	—			1							✓					✓		
	/	:																				
AOC8BG1401	/	09:12	S	E	—			1							✓					✓		
AOC8BG1400	/	09:10	S	E	—			1							✓					✓		
	/	:																				
	/	:																				
	/	:																				
	/	:																				
	/	:																				

PAGE 1 of 1

Clients Special Instructions:

Temperature _____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) E. J. Klein	Date: 7/20/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: Baker	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) Fed Ex	Date: 7/20/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 00102

Project Name : MCB CLEJ SWMU STUDY	Client Address : BAKER ENVIRON	Point-of-Contact : JIM CULP
Carrier : FED EX	420 ROUSER RD	Telephone No. : 412/269-2098
Airbill No. : 818028326954	CORAOPOLIS, PA 15108	Sampling complete? Y or N (see Note 1)
Sampler Name : VARIOUS	Sampler Signature : [signature]	Project-specific (PS) or Batch (B) QC ? ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC TOX	O&G / TPH				
S256ISO201	7/18	08:25															✓					
S258ISO501	7/17	14:10															✓					
S318SSO103	7/18	08:36															✓					
S318ISO103	7/18	07:58															✓					
S299ISO201	7/18	10:05															✓					
S299ISO301	7/18	09:48															✓					
S299ISO401	7/18	09:37															✓					
S308ISO407	7/17	16:10															✓					
S308ISO302	7/18	14:30															✓					
S299ISOSO#1	7/18	14:06															✓					

PAGE 3 of 3

Remarks / Comments (see Notes 2 & 3)

Clients Special Instructions:

Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, if any:**

#1 Relinquished By: (Sig) [signature]	Date: 7/18/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/18/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

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CHAIN-OF-CUSTODY RECORD

No. 00[illegible]

Project Name : MCB CLEJ SWMU STUDY	Client Address : BAKER ENVIRON 420 KOUSER RD CORAOPOLIS, PA 15108	Point-of-Contact : JIM CULP
Carrier : FED EX		Telephone No. : 412/269-2096
Airbill No. : 818028326954		Sampling complete? (Y) or N (see Note 1)
Sampler Name : VARIOUS	Sampler Signature : E.J.K	Project-specific (PS) or Batch (B) QC ? ____

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other____; T. TCLP

PAGE 2 of 3

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
S31SIS0307	7/17	16:00	S														✓		
S303IS0402	7/17	13:50	S														✓		
S272IS0302	7/17	14:50	S														✓		
S272IS0402	7/17	14:45	S														✓		
S255SS0104	7/18	10:39	S														✓		
SM43IS0407	7/18	11:37	S														✓		
SM43IS0107	7/18	11:28	S														✓		
S254SS0105	7/18	10:07	S														✓		
S254IS0105	7/18	10:00	S														✓		
S256IS0301	7/18	08:18															✓		

Clients Special Instructions: Temperature ____ °C

Lab: Received in Good Condition? Y or N **Describe Problems, If any:**

#1 Relinquished By: (Sig) P.J. Klein	Date: 7/18/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER	Time: 1700	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) FED EX	Date: 7/18/00	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name:	Time: 1700	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

CompuChem
a division of Liberty Analytical Corp.
501 Madison Avenue
Cary, NC 27513
1-800-833-5097

CHAIN-OF-CUSTODY RECORD

No. 031070

Project Name: MCB CLEJ SWMU STUDY	Client Address: BAKER ENVIRON.	Point-of-Contact: TIM CULP
Carrier: FED EX	420 ROUSER RD.	Telephone No.: 412/269-2098
Airbill No.: 818028326954	CORAOPOLIS, PA 15108	Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC ?

BOX #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil / Sediment / Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other_____

BOX #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other_____; H. NaHSO4 + Ice; I. ZnAc+NaOH + Ice

BOX #3: F. Filtered; U. Unfiltered

Box #4: H. High; M. Medium; L. Low

Box #5: C. CLP 3/90; S. SW-846; W. CWA 600-series; O. Other_____; T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC / TOX	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
SM43ISO307	7/17	18:17	S	E	—			1									✓		
S[illegible]16ISO104	7/17	12:27	S	E	—			1									✓		
S316ISO304	7/17	12:37	S	E	—			1									✓		
S272ISO102	7/17	14:33	S	E	—			1									✓		
S302ISO303	7/17	13:23	S	E	—			1									✓		
S264SSO104	7/17	17:05	S	E	—			1									✓		
SM43ISO207	7/17	18:05	S	E	—			1									✓		
S264ISO104	7/17	16:52	S	E	—			1									✓		
S316ISO204	7/17	12:19	S	E	—			1									✓		
S272ISO202	7/17	14:20	S	E	—			1									✓		

Clients Special Instructions: Temperature _____ °C

Lab: Received in Good Condition? Y or N Describe Problems, If any:

#1 Relinquished By: (Sig) [signature]	Date: 7/18/00	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:
Company Name: BAKER	Time: 1700	Company Name:	Time:	Company Name:	Time:
#1 Received By: (Sig) FED EX	Date: 7/18/00	#2 Received By: (Sig)	Date:	#3 Received By: (Sig)	Date:
Company Name:	Time: 1700	Company Name:	Time:	Company Name:	Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

CHAIN-OF-CUSTODY RECORD

No. 031920

CompuChem
a division of Liberty Analytical Corp.
501 Madison Avenue
Cary, NC 27513
1-800-833-5097

Project Name: MCB CLEJ SWMU STUDY	Client Address: BAKER ENVIRON. 420 ROUSER RD. CORAOPOLIS, PA 15108	Point-of-Contact: JIM CULP
Carrier: FED EX		Telephone No.: 412/269-2048
Airbill No.: 818028326932		Sampling complete? (Y) or N (see Note 1)
Sampler Name: VARIOUS	Sampler Signature: EJK	Project-specific (PS) or Batch (B) QC ?

BOX #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil / Sediment / Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other_____

BOX #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other_____
H. NaHSO4 + Ice
I. ZnAc+NaOH + Ice

BOX #3
F. Filtered
U. Unfiltered

Box #4
H. High
M. Medium
L. Low

Box #5
C. CLP 3/90
S. SW-846
W. CWA 600-series
O. Other_____
T. TCLP

Sample ID (9 characters maximum)	Date: Year 2000	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered / Unfiltered	Box #4 Expected Conc.	Box #5 Method	No. of Bottles	Use for Lab QC (MS or DUP)	VOA	SVOC	Pesticide	PCB	Herbicide	Metals / Mercury	Cyanide	TOC	O&G / TPH	Remarks / Comments (see Notes 2 & 3)
S261IS02007	7/18	19:07	S	E	-			1									✓		PAGE 1 of 1
S258IS02007	7/18	18:08	S	E	-			1									✓		
S285IS03004	7/19	08:10	S	E	-			1									✓		
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	
	/	:																	

Clients Special Instructions: Temperature _____ °C

Lab: Received in Good Condition? Y or N Describe Problems, if any:

#1 Relinquished By: (Sig) P. A. Klein Date: 7/20/00	#2 Relinquished By: (Sig) Date:	#3 Relinquished By: (Sig) Date:
Company Name: BAKER Time: 1700	Company Name: Time:	Company Name: Time:
#1 Received By: (Sig) FED EX Date: 7/20/00	#2 Received By: (Sig) Date:	#3 Received By: (Sig) Date:
Company Name: Time: 1700	Company Name: Time:	Company Name: Time:

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now.
Note (2): Samples stored 60 days after date report mailed at no extra charge. Note (3): All lab copies of data destroyed after three years.

APPENDIX E
ANALYTICAL DATA AND STATISTICS FOR FINE SAND SURFACE SOILS

APPENDIX E.1
ANALYTICAL RESULTS FOR FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG02-00	BASE-BG03-00	BASE-BG04-00	BASE-BG05-00	BASE-BG06-00	BASE-BG09-00	BASE-BG10-00	BASE-BG11-00
SAMPLE DATE	7/13/00	7/13/00	7/11/00	7/13/00	7/13/00	7/14/00	7/13/00	7/11/00
METALS (mg/kg)								
Aluminum	1380	2090	8530	2320	3140	190	5390	2540
Antimony	0.24 UJ	0.27 J	0.32 UJ	0.19 U	0.22 UJ	0.26 J	0.19 U	0.42 UJ
Arsenic	0.73	0.27 U	0.42 J	0.3 J	0.27 U	0.26 U	0.64 J	0.83 J
Barium	6	6.3	14	9.5	6.7	1.6	12	14.1
Beryllium	0.058 U	0.042 J	0.11 U	0.094 J	0.038 U	0.02 J	0.07 J	0.11 J
Cadmium	0.021 U	0.021 U	0.021 U	0.02 U	0.021 U	0.02 U	0.02 U	0.11 J
Calcium	52.7 J	87.6 J	170	17400	152	46.2 U	592	105000
Chromium	0.85	1.9	9.4	2	3	0.51 J	6.4	9.7
Cobalt	0.19 J	0.083 U	0.4 J	0.12 J	0.14 J	0.082 U	0.34 J	0.3 J
Copper	0.73	0.88	1.3	0.41 U	0.83	2.1	1.5	2.9
Iron	365	971	5000	1040	623	126	3830	2420
Lead	3.1 J	3 J	7.4 J	4 J	4.6 J	2.8	5.4 J	38.5 J
Magnesium	27.9 J	47.4 J	274	333	65.3 J	14 U	146	1610
Manganese	17	2.1 J	5.1	9.5 J	2.1	2.3 U	6.4 J	25.9
Mercury	0.028 UJ	0.048	0.038	0.044 U	0.053 UJ	0.053 U	0.05 U	0.069
Nickel	0.84	0.64	1.6	0.64	0.91	0.092 U	1.4	1.6
Potassium	22.3 J	34.4 J	169 J	45.8 J	73.8 J	13.2 U	88.4 J	263 J
Selenium	0.23 U	0.23 UJ	0.36 J	0.22 UJ	0.25 J	0.22 U	0.22 UJ	0.63 J
Silver	0.084 U	0.083 U	0.085 U	0.079 U	0.082 U	0.082 U	0.08 U	0.083 U
Sodium	26.2 U	62.8 U	37.7 U	64.7 U	61.1 U	73.7 U	69.1 U	307
Thallium	0.35 UJ	0.34 UJ	0.35 UJ	0.32 UJ	0.34 UJ	0.34 UJ	0.33 UJ	0.34 UJ
Vanadium	1.2 J	2.8	13.4	2.2 U	3.4	1.2 J	9.8	7.7
Zinc	1.5 U	2.5 U	3.8	2.7	2.8 U	1.5 J	3.4	18.4

Notes: U - Not Detected
mg/kg = Milligrams per Kilogram
J - Resultant concentration is estimated

APPENDIX E.1
ANALYTICAL RESULTS FOR FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG17-00	BASE-BG18-00	BASE-BG20-00	BASE-BG21-00	BASE-BG22-00	BASE-BG23-00	BASE-BG24-00	BASE-BG25-00
SAMPLE DATE	7/13/00	7/14/00	7/16/00	7/15/00	7/14/00	7/11/00	7/13/00	7/15/00
METALS (mg/kg)								
Aluminum	2140	894	2520 J	53.9	4270 J	2660	123	1460
Antimony	0.19 U	0.2 U	0.34 J	0.19 U	0.25 J	0.9 J	0.37 UJ	0.31 J
Arsenic	0.26 U	0.27 U	0.29 U	0.26 U	0.85 J	0.28 U	0.27 U	0.46 J
Barium	6.1	2.4	9.2	2.3	9.2	9.1	3.6	5.7
Beryllium	0.047 J	0.01 U	0.061 J	0.016 J	0.038 J	0.066 U	0.013 U	0.082 J
Cadmium	0.02 U	0.021 U	0.022 U	0.02 U	0.02 U	0.021 U	0.021 U	0.02 U
Calcium	49.4 J	44.2 J	48.6 J	43.7 U	171	3840	327	112
Chromium	1.7	0.98	3.5	0.29 U	4.4	3.3 J	0.42 J	1.4
Cobalt	0.081 U	0.083 U	0.17 J	0.08 U	0.19 J	0.2 J	0.083 U	0.089 J
Copper	1.2	1.1	0.53 U	0.24 U	1.2	18.2	4.1	0.97 U
Iron	858	751	707 J	44	1890 J	1440	106	884
Lead	8 J	4 J	4.3 J	0.45	8.7 J	32.5 J	3 J	7
Magnesium	48.7 J	18.8 J	75.2 J	9.5 U	95.9 J	106	56.2	88.6 J
Manganese	8.7 J	2.6 J	1.6	3.3 J	5.5	18.7	3.1	2.3 J
Mercury	0.037 U	0.033 U	0.032 J	0.045 U	0.04	0.028 J	0.036 UJ	0.063 U
Nickel	0.48 J	0.24 J	0.11 J	0.09 U	0.9	1.8	0.64 U	0.55
Potassium	27.6 J	15 J	74.2 J	6.5 U	73 J	54.7 J	36.8 J	34.2 J
Selenium	0.22 UJ	0.23 UJ	0.63	0.22 U	0.22 U	0.23 U	0.34 J	0.32 J
Silver	0.081 U	0.083 U	0.089 U	0.08 U	0.081 U	0.085 U	0.083 U	0.11 J
Sodium	55.7 U	53.3 U	103 U	46.5 U	75.8 U	52.4 U	85.7 U	78 U
Thallium	0.34 UJ	0.34 UJ	0.37 UJ	0.33 UJ	0.33 UJ	0.35 UJ	0.34 UJ	0.34 UJ
Vanadium	2.4	1.8 J	4.7	0.44 J	6.8	3.6 J	0.49 J	3.8
Zinc	5.2	3	0.36 J	0.24 U	1.9 J	25.4	10.8	5.6

Notes: U - Not Detected
mg/kg = Milligrams per Kilogram
J - Resultant concentration is estimated

APPENDIX E.1
ANALYTICAL RESULTS FOR FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG26-00	BASE-BG27-00	BASE-BG28-00	BASE-BG30-00	BASE-BG31-00	BASE-BG32-00	BASE-BG33-00	BASE-BG34-00
SAMPLE DATE	7/14/00	7/14/00	7/15/00	7/12/00	7/16/00	7/15/00	7/14/00	7/15/00
METALS (mg/kg)								
Aluminum	919	73 J	2870	29.4	6350	1470	31	1820
Antimony	0.37 J	0.26 J	0.19 U	0.22 UJ	0.22 UJ	0.22 U	0.2 U	0.28 J
Arsenic	0.25 U	0.33 U	0.35 J	0.26 U	0.3 U	0.3 U	0.27 U	0.26 U
Barium	4.3	0.73 J	6.9	0.28 U	24	2.2	0.48 U	3.5
Beryllium	0.026 J	0.013 U	0.05 J	0.018 U	0.08 J	0.033 J	0.018 J	0.036 J
Cadmium	0.019 U	0.026 U	0.056 J	0.02 U	0.023 U	0.023 U	0.021 U	0.02 U
Calcium	126	12.4 J	2030	11.8 U	67.8 J	44.7 U	37.2 U	67.5 J
Chromium	1.3	0.22 U	4.3	0.17 U	4.1	1.3	0.26 U	1.9
Cobalt	0.076 U	0.1 U	0.16 J	0.079 U	0.26 J	0.094 U	0.083 U	0.12 J
Copper	1.3	0.34 U	1.7	0.9	1.2	0.82 U	0.28 U	2.2
Iron	456	51.4 J	2200	26.3	2670	1030	40.2	836
Lead	3.2	1 J	3.4	0.53 J	5.7	2.3	1.2	2.6
Magnesium	29 J	7.2 U	107	6.9 U	115	38.5 J	10.1 U	53.5 J
Manganese	4.1 J	0.53 U	8.5 J	0.29 U	5	9.4 J	5.2 J	14.2 J
Mercury	0.048 U	0.021 J	0.071 U	0.017 U	0.12 J	0.066 U	0.036 U	0.063 U
Nickel	0.35 J	0.12 U	0.76	0.088 U	1.4	0.31 J	0.093 U	0.53
Potassium	17.6 U	5.8 J	66.3 J	3.8 U	79 J	28.9 J	10.3 U	29.8 J
Selenium	0.21 U	0.28 U	0.37 J	0.22 U	0.25 U	0.26 U	0.23 U	0.22 U
Silver	0.076 U	0.1 U	0.079 U	0.079 U	0.091 U	0.094 U	0.083 U	0.079 U
Sodium	48.5 U	112 U	49.5 U	28.8 U	78.7 U	94.3 U	73.2 U	69.1 U
Thallium	0.32 UJ	0.42 UJ	0.33 UJ	0.32 UJ	0.38 UJ	0.39 UJ	0.34 UJ	0.33 UJ
Vanadium	1.5 B	0.36 J	5.2	0.14 J	6.5	2.3 J	0.35 J	2.4
Zinc	2.7	0.31 U	3.1	1.1 U	2.8 U	1.8 J	0.37 U	5.4

Notes: U - Not Detected
mg/kg = Milligrams per Kilogram
J - Resultant concentration is estimated

APPENDIX E.1
ANALYTICAL RESULTS FOR FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG35-00	BASE-BG36-00	BASE-BG37-00	BASE-BG38-00	BASE-BG39-00	BASE-BG41-00	BASE-BG42-00	BASE-BG43-00
SAMPLE DATE	7/16/00	7/15/00	7/16/00	7/16/00	7/16/00	7/15/00	7/16/00	7/16/00
METALS (mg/kg)								
Aluminum	2630 J	670	2450 J	54.5	1040	1120	2420	79.6
Antimony	0.46 J	0.28 J	0.55 J	0.2 UJ	0.23 UJ	0.48 J	0.33 UJ	0.2 UJ
Arsenic	0.27 U	0.28 U	0.35 U	0.27 U	0.32 U	0.37 J	0.29 U	0.28 U
Barium	6	2.2	1.6	0.93 J	4.4	2.5	4.6	1.1
Beryllium	0.06 J	0.033 J	0.014 U	0.01 U	0.012 U	0.037 J	0.041 J	0.011 U
Cadmium	0.021 U	0.022 U	0.027 U	0.021 U	0.037 J	0.064 J	0.022 U	0.021 U
Calcium	423	77.2 J	30.7 J	143	222	402	268	25.3 J
Chromium	2.2	0.9	2.6	0.24 J	1.4	1.7	2.3	0.41 J
Cobalt	0.15 J	0.086 U	0.11 U	0.084 U	0.098 U	0.097 U	0.14 J	0.085 U
Copper	38.5	1.1	1 U	0.43 J	0.88	1.2	5.4	0.29 J
Iron	1520 J	434	538 J	40.1	369	724	1090	55.8
Lead	4.3 J	3.9	2.4 J	0.99	5.8	2.1	3.7	1.5
Magnesium	159	32.1 J	19.8 J	21.6 J	24.7 J	42.2 J	81.1 J	9.8 J
Manganese	16.9	2.8 J	1 U	0.74 J	1.7	4.5 J	5.8	0.94 J
Mercury	0.04	0.08 U	0.029 J	0.051 J	0.086 J	0.05 U	0.059 J	0.047 J
Nickel	0.62	0.097 U	0.3 J	0.095 U	0.19 J	0.37 J	0.53 J	0.096 U
Potassium	47 J	18.8 U	23.7 J	10.2 J	18.7 J	21.9 U	33.6 J	13 J
Selenium	0.46 J	0.24 U	0.31 J	0.23 U	0.27 U	0.27 U	0.24 U	0.23 U
Silver	0.083 U	0.086 U	0.11 U	0.084 U	0.098 U	0.097 U	0.089 U	0.085 U
Sodium	111 U	67.4 U	127 U	83.6 U	94.8 U	95.4 U	74.3 U	78.8 U
Thallium	0.34 UJ	0.36 UJ	0.45 UJ	0.35 UJ	0.4 UJ	0.4 UJ	0.36 UJ	0.35 UJ
Vanadium	2.4	1.5 J	3.7	0.27 J	1.5 J	1.8 J	2 J	0.54 J
Zinc	3.4	1.3 J	5.3	1.6 U	6.3	1.5 J	73.9	1.3 U

Notes: U - Not Detected
mg/kg = Milligrams per Kilogram
J - Resultant concentration is estimated

APPENDIX E.1
ANALYTICAL RESULTS FOR FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG44-00	BASE-BG45-00	BASE-BG46-00	BASE-BG47-00	BASE-BG48-00	BASE-BG49-00	BASE-BG50-00
SAMPLE DATE	7/16/00	7/17/00	7/13/00	7/16/00	7/12/00	7/12/00	7/12/00
METALS (mg/kg)							
Aluminum	3160	664	478	708	40.8	7280	41.6
Antimony	0.2 UJ	0.2 UJ	0.46 J	0.2 UJ	0.2 UJ	0.2 UJ	0.27 UJ
Arsenic	0.58 J	0.27 U	0.27 U	0.27 U	0.27 U	0.39 J	0.27
Barium	13.8	2.7	2.1	4.5	0.32 U	19.5	0.69 U
Beryllium	0.079 J	0.012 J	0.01 U	0.016 J	0.015 U	0.11 J	0.017 U
Cadmium	0.021 U	0.021 U	0.021 U	0.02 U	0.021 U	0.021 U	0.021 U
Calcium	56.2 J	72.1 J	58.6 J	176	18 U	369	18.3 U
Chromium	2.7	1.2	0.7	1.3	0.3 U	6.9	0.45 U
Cobalt	0.13 J	0.084 U	0.083 U	0.11 J	0.083 U	0.37 J	0.083 U
Copper	0.96	0.44 J	4.9	0.89	0.16 U	0.98	0.16 U
Iron	1400	346	298	412	34.8	2290	94.5
Lead	6.1	1.7	5.5 J	2.4	0.57 J	5.2 J	1.4 J
Magnesium	68.9 J	25.8 J	22.2 J	30.1 J	5.2 U	222	7.7 U
Manganese	8.6	2	2 J	8	0.49 U	3.7	0.64 J
Mercury	0.096 J	0.06 J	0.038 U	0.058 J	0.017 U	0.023 J	0.02 J
Nickel	0.58	0.094 U	0.15 J	0.44 J	0.093 U	1.3	0.094 U
Potassium	39.7 J	23.6 J	19.4 J	24.7 J	4.7 U	212 J	5 U
Selenium	0.23 U	0.23 U	0.23 UJ	0.23 U	0.23 U	0.23 U	0.23 U
Silver	0.085 U	0.084 U	0.083 U	0.082 U	0.083 U	0.085 U	0.083 U
Sodium	85.1 U	85.7 U	52.9 U	78.2 U	26.5 U	25.3 U	31.8 U
Thallium	0.35 UJ	0.34 UJ	0.34 UJ	0.34 UJ	0.34 UJ	0.35 UJ	0.34 UJ
Vanadium	3.8	1.6 J	1.2 J	2.7	0.16 J	10.5	0.54 J
Zinc	2.8 U	1.6 U	8.5	2 U	0.67 U	3.2	0.66 U

Notes: U - Not Detected
mg/kg = Milligrams per Kilogram
J - Resultant concentration is estimated

APPENDIX E.2
STATISTICS FOR INORGANICS IN FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Percent Non-Detect	Percent Detected	Frequency of Detection	Arithmatic Mean Positive Detects	Median Positive Detects	Arithmatic Mean Half Non-Detects
METALS (mg/kg)										
Aluminum	0	0	29.4	8530	0%	100%	39/39	1951.28	1460	1951.2769
Antimony	0.19 U	0.42 UJ	0.25 J	0.9 J	64%	36%	14/39	0.39	0.33	0.2147
Arsenic	0.25 U	0.35 U	0.27	0.85 J	69%	31%	12/39	0.52	0.44	0.2554
Barium	0.28 U	0.69 U	0.73 J	24	10%	90%	35/39	6.44	4.6	5.8012
Beryllium	0.01 U	0.11 U	0.012 J	0.11 J	38%	62%	24/39	0.05	0.04	0.0364
Cadmium	0.019 U	0.027 U	0.037 J	0.11 J	90%	10%	4/39	0.07	0.06	0.0163
Calcium	11.8 U	46.2 U	12.4 J	105000	18%	82%	32/39	4146.04	134.5	3404.6987
Chromium	0.17 U	0.45 U	0.24 J	9.7	15%	85%	33/39	2.63	1.9	2.2501
Cobalt	0.076 U	0.11 U	0.089 J	0.4 J	54%	46%	18/39	0.2	0.17	0.1151
Copper	0.16 U	1 U	0.29 J	38.5	26%	74%	29/39	3.42	1.2	2.6094
Iron	0	0	26.3	5000	0%	100%	39/39	974.64	707	974.6436
Lead	0	0	0.45	38.5 J	0%	100%	39/39	5.24	3.4	5.2369
Magnesium	5.2 U	14 U	9.8 J	1610	18%	82%	32/39	127.98	54.85	105.7846
Manganese	0.29 U	2.3 U	0.64 J	25.9	13%	87%	34/39	6.43	4.75	5.6647
Mercury	0.017 U	0.08 U	0.02 J	0.12 J	51%	49%	19/39	0.05	0.05	0.0366
Nickel	0.088 U	0.64 U	0.11 J	1.8	31%	69%	27/39	0.72	0.58	0.5227
Potassium	3.8 U	21.9 U	5.8 J	263 J	23%	77%	30/39	56.25	34.3	44.5769
Selenium	0.21 U	0.28 U	0.25 J	0.63	77%	23%	9/39	0.41	0.36	0.1838
Silver	0.076 U	0.11 U	0.11 J	0.11 J	97%	3%	1/39	0.11	0.11	0.0443
Sodium	25.3 U	127 U	307	307	97%	3%	1/39	307	307	41.4308
Thallium	0.32 UJ	0.45 UJ	0	0	100%	0%	0/39	0	0	0.1755
Vanadium	1.5 B	2.2 U	0.14 J	13.4	5%	95%	37/39	3.11	2.3	2.9959
Zinc	0.24 U	2.8 U	0.36 J	73.9	38%	62%	24/39	8.27	3.4	5.374

APPENDIX E.2
STATISTICS FOR INORGANICS IN FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Degree of Freedom	H Statistic	Log Upper 95% Confidence Level	Location of Maximum Detect
METALS (mg/kg)								
Aluminum	2059.1468	2507.1818	6.7	1.7	38	3.355	8756.887	BASE-BG04-00
Antimony	0.1705	0.2607	-1.76	0.63	38	2.075	0.2601	BASE-BG23-00
Arsenic	0.2077	0.3115	-1.59	0.62	38	2.075	0.3043	BASE-BG22-00
Barium	5.4781	7.2801	1.21	1.26	38	3.008	13.7358	BASE-BG31-00
Beryllium	0.0305	0.0446	-3.73	1	38	2.383	0.0579	BASE-BG11-00,BASE-BG49-00
Cadmium	0.0193	0.0215	-4.37	0.56	38	1.988	0.0178	BASE-BG11-00
Calcium	16933.1532	7976.1175	4.77	1.98	38	3.715	2783.5166	BASE-BG11-00
Chromium	2.3828	2.8934	0.2	1.26	38	3.008	5.0425	BASE-BG11-00
Cobalt	0.101	0.1424	-2.48	0.78	38	2.171	0.1497	BASE-BG04-00
Copper	6.6091	4.3936	-0.1	1.31	38	3.008	4.0486	BASE-BG35-00
Iron	1093.7079	1269.9103	6.14	1.45	38	3.008	2681.8206	BASE-BG04-00
Lead	7.4653	7.2523	1.18	0.93	38	2.383	7.2052	BASE-BG11-00
Magnesium	258.1513	175.4773	3.64	1.41	38	3.008	205.192	BASE-BG11-00
Manganese	5.8706	7.2496	1.15	1.24	38	2.682	11.6883	BASE-BG11-00
Mercury	0.0239	0.0431	-3.48	0.59	38	1.988	0.0444	BASE-BG31-00
Nickel	0.5069	0.6595	-1.28	1.28	38	3.008	1.1877	BASE-BG23-00
Potassium	56.1883	59.746	3.17	1.21	38	2.682	83.3406	BASE-BG11-00
Selenium	0.1396	0.2215	-1.87	0.54	38	1.988	0.2115	BASE-BG11-00,BASE-BG20-00
Silver	0.0113	0.0474	-3.13	0.17	38	1.734	0.0463	BASE-BG25-00
Sodium	45.3844	53.6832	3.52	0.55	38	1.988	47.0093	BASE-BG11-00
Thallium	0.0139	0.1793	-1.74	0.07	38	1.695	0.1791	
Vanadium	3.0887	3.8298	0.56	1.15	38	2.682	5.5756	BASE-BG04-00
Zinc	12.3206	8.7002	0.66	1.38	38	3.008	9.8619	BASE-BG42-00

APPENDIX E.2
STATISTICS FOR INORGANICS IN FINE SAND SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

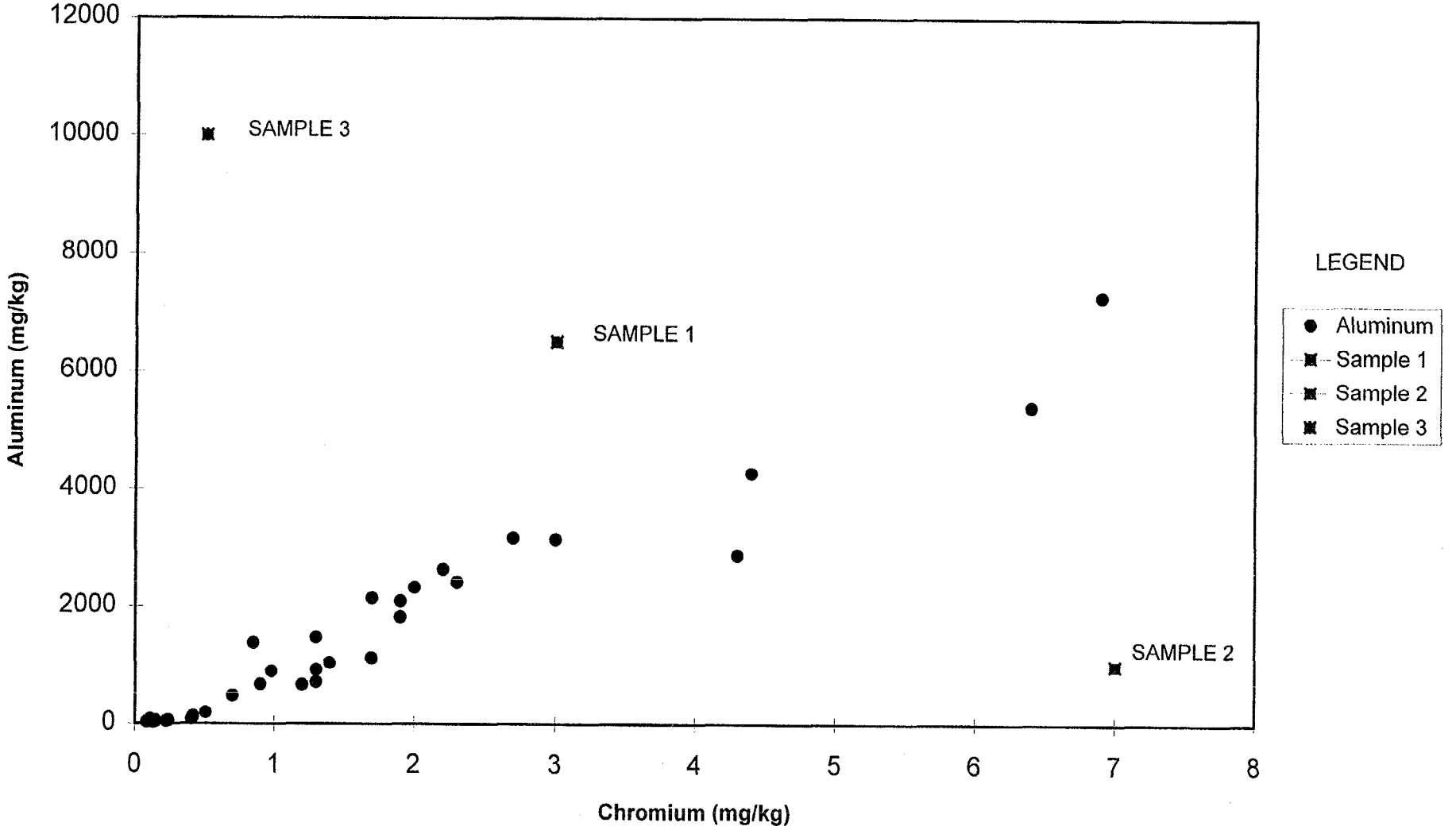
	Lognormal Distribution			Normal Distribution			Sample	Frequency
	W-Value	Quantile	True/False	W-Value	Quantile	True/False	Count	of Detection
METALS (mg/kg)								
Aluminum	0.869860151	0.939	FALSE	0.823783118	0.939	FALSE	39	39/39
Antimony	0.838257924	0.939	FALSE	0.730609284	0.939	FALSE	39	14/39
Arsenic	0.721066286	0.939	FALSE	0.656915057	0.939	FALSE	39	12/39
Barium	0.924290787	0.939	FALSE	0.849204019	0.939	FALSE	39	35/39
Beryllium	0.91603916	0.939	FALSE	0.873027677	0.939	FALSE	39	24/39
Cadmium	0.45952313	0.939	FALSE	0.380029175	0.939	FALSE	39	4/39
Calcium	0.895502608	0.939	FALSE	0.215071375	0.939	FALSE	39	32/39
Chromium	0.943356905	0.939	TRUE	0.790385878	0.939	FALSE	39	33/39
Cobalt	0.819799888	0.939	FALSE	0.759122863	0.939	FALSE	39	18/39
Copper	0.954337466	0.939	TRUE	0.372423452	0.939	FALSE	39	29/39
Iron	0.921212119	0.939	FALSE	0.791357262	0.939	FALSE	39	39/39
Lead	0.95301944	0.939	TRUE	0.505404769	0.939	FALSE	39	39/39
Magnesium	0.969388197	0.939	TRUE	0.368306228	0.939	FALSE	39	32/39
Manganese	0.95934032	0.939	TRUE	0.807946312	0.939	FALSE	39	34/39
Mercury	0.979526993	0.939	TRUE	0.834634562	0.939	FALSE	39	19/39
Nickel	0.870415366	0.939	FALSE	0.842284302	0.939	FALSE	39	27/39
Potassium	0.972283997	0.939	TRUE	0.684846594	0.939	FALSE	39	30/39
Selenium	0.650193119	0.939	FALSE	0.59073106	0.939	FALSE	39	9/39
Silver	0.508915188	0.939	FALSE	0.380773035	0.939	FALSE	39	1/39
Sodium	0.873712877	0.939	FALSE	0.403127885	0.939	FALSE	39	1/39
Thallium	0.807567065	0.939	FALSE	0.7789955	0.939	FALSE	39	0/39
Vanadium	0.967105034	0.939	TRUE	0.802759422	0.939	FALSE	39	37/39
Zinc	0.984163324	0.939	TRUE	0.414659311	0.939	FALSE	39	24/39

APPENDIX E
GRAPH 1

BASE BACKGROUND SURFACE SOILS - FINE SAND

Scatter Plot

Aluminum vs Chromium



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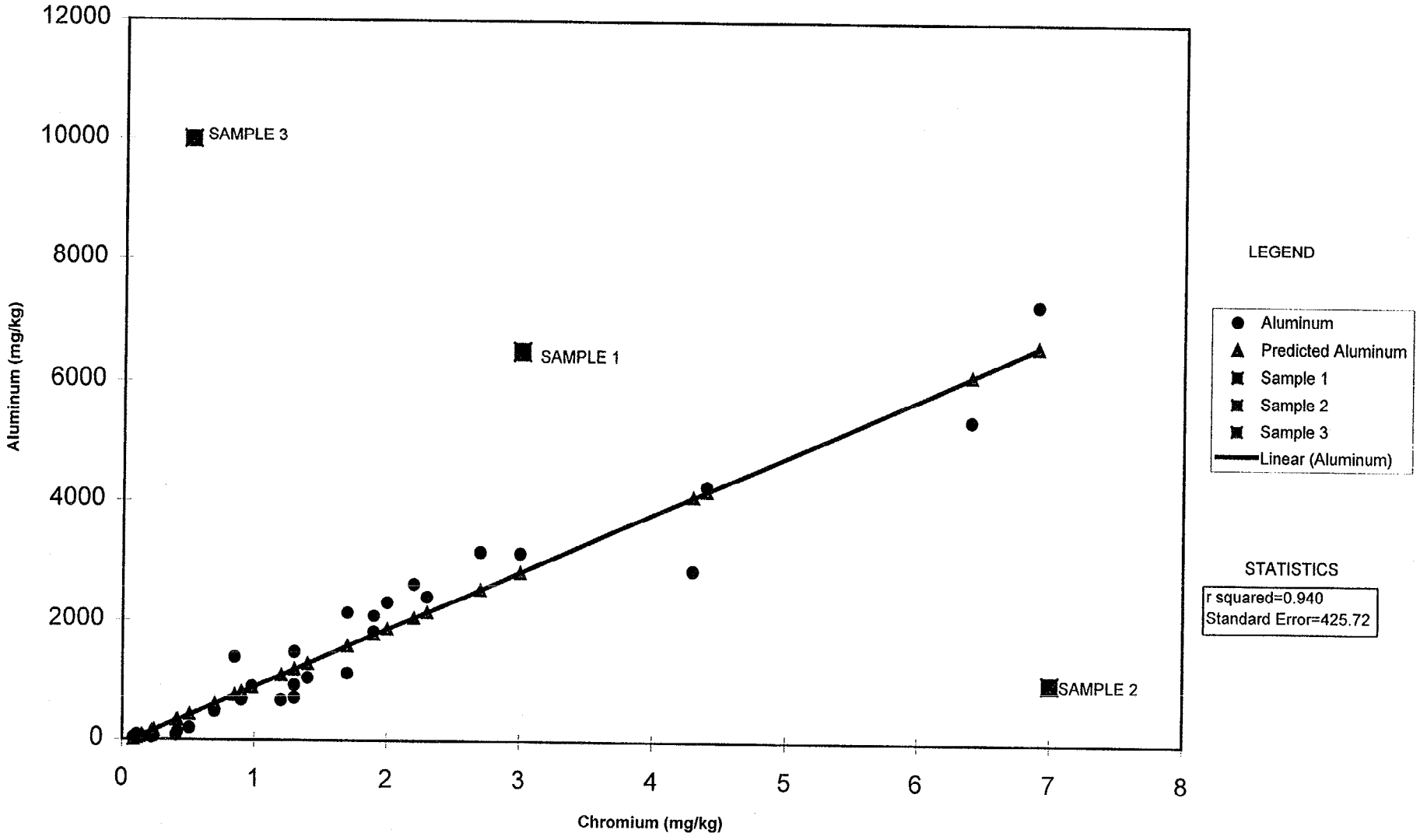
4/5/01

APPENDIX E
GRAPH 2

BASE BACKGROUND SURFACE SOILS - FINE SAND

Linear Regression

Aluminum vs Chromium



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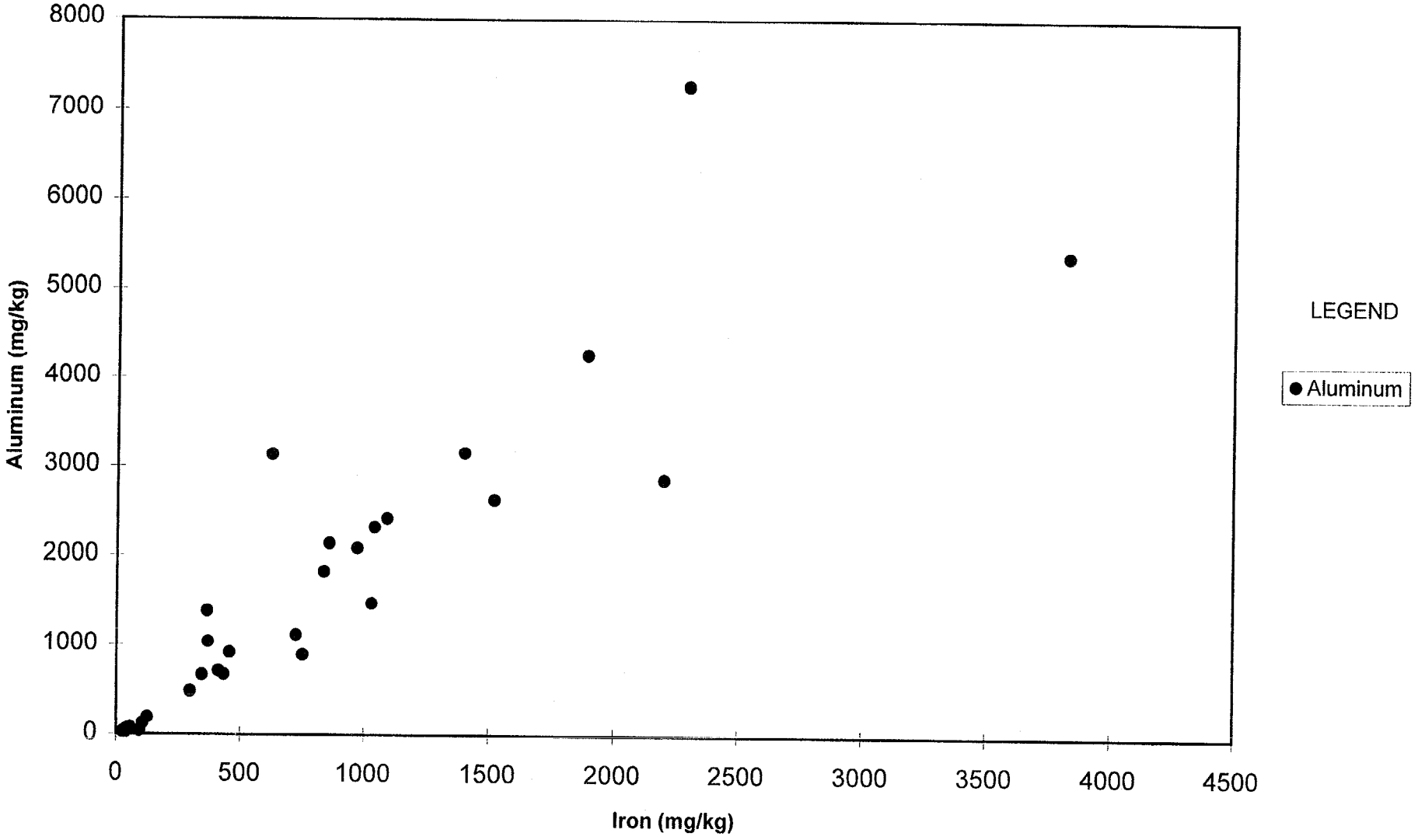
4/5/01

APPENDIX E
GRAPH 3

BASE BACKGROUND SURFACE SOILS - FINE SAND

Scatter Plot

Aluminum vs Iron



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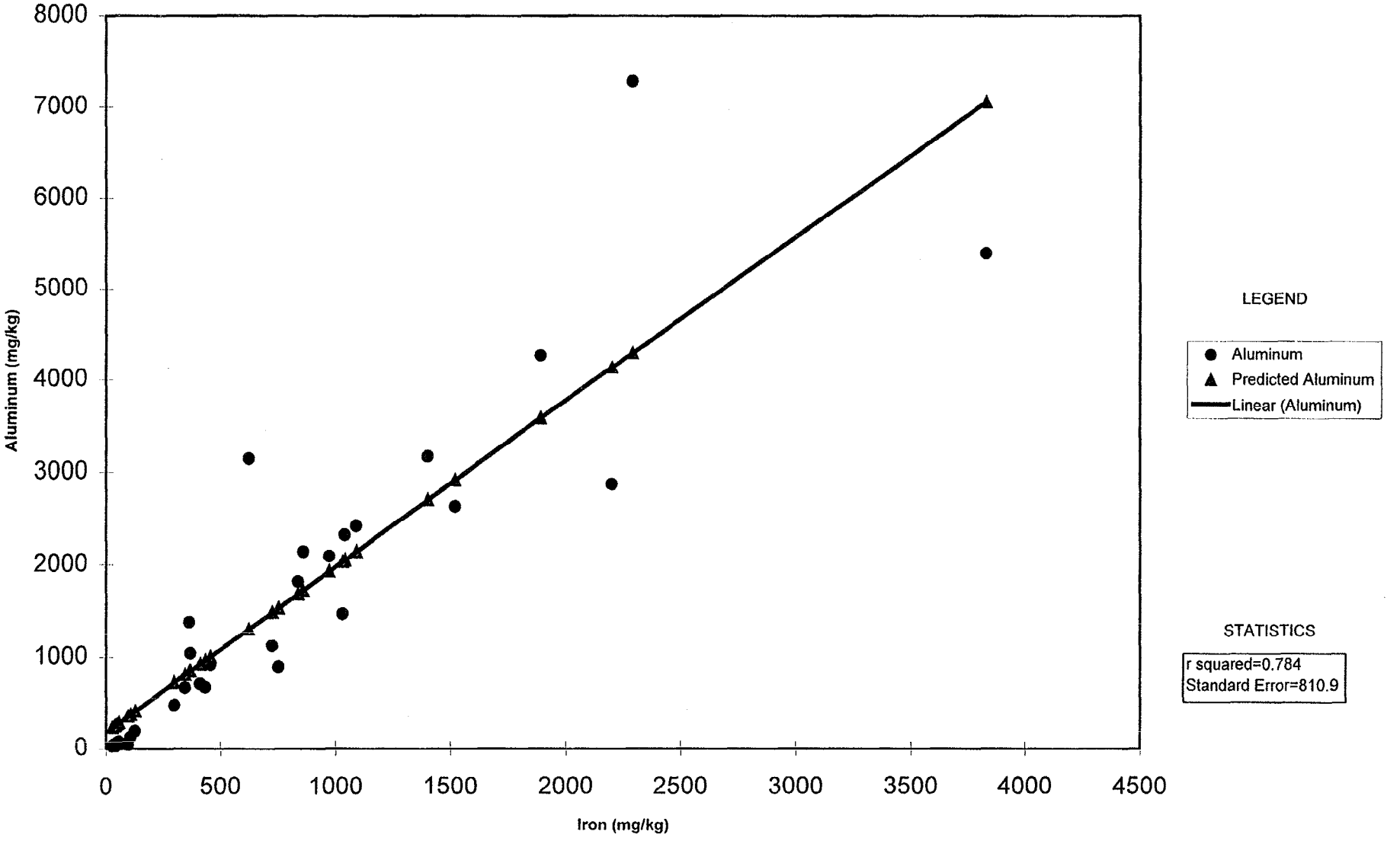
4/5/01

APPENDIX E
GRAPH 4

BASE BACKGROUND SURFACE SOILS - FINE SAND

Linear Regression
Aluminum vs Iron



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4/5/01

APPENDIX F
ANALYTICAL DATA AND STATISTICS FOR LOAMY SURFACE SOILS

APPENDIX F.1
ANALYTICAL RESULTS FOR LOAMY SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG01-00	BASE-BG07-00	BASE-BG08-00	BASE-BG12-00	BASE-BG13-00	BASE-BG14-00	BASE-BG15-00	BASE-BG16-00
SAMPLE DATE	7/11/00	7/13/00	7/16/00	7/11/00	7/11/00	7/12/00	7/16/00	7/13/00
METALS (mg/kg)								
Aluminum	2040	2170	3680 J	9130	5390	3770	4730 J	4820
Antimony	0.22 UJ	0.2 U	0.32 J	0.44 UJ	0.49 J	0.23 UJ	0.3 J	0.34 J
Arsenic	0.28 U	0.27 U	0.62 J	0.73 J	0.49 J	0.3 U	0.3 U	1
Barium	3.9	7.3	16.7	19.6	9.2	12	10	20
Beryllium	0.062 U	0.029 J	0.077 J	0.14 J	0.09 U	0.098 U	0.1 J	0.072 J
Cadmium	0.021 U	0.021 U	0.023 U	0.033 U	0.022 U	0.023 U	0.023 U	0.056 J
Calcium	28.4 U	299	11500	200	75.3 J	344	44.3 J	8720
Chromium	2.7	2.3	4.6	9.6	6.1 J	3.3	5	7.4
Cobalt	0.086 U	0.083 U	0.44 J	0.45 J	0.31 J	0.1 J	0.51 J	0.29 J
Copper	0.33 J	0.84 U	2	2.2	1.6	0.57 J	1.6	5.8
Iron	251	1300	2410 J	6050	7900	2910	1220 J	3940
Lead	3.2 J	12.1 J	8.2 J	9.9 J	5.4 J	5.1 J	7.9 J	26.8 J
Magnesium	25.9 J	45.4 J	286	241	130	114 J	131	330
Manganese	0.81 J	1.3 J	49	7.3	3.1	5.3	2.5	13.6 J
Mercury	0.041	0.056 U	0.052	0.06	0.018 U	0.032 J	0.061	0.26 U
Nickel	0.31 J	0.42 J	1.2	1.7	0.83	0.49 J	0.72	1.4
Potassium	46.4 J	35.9 J	139	168 J	162	61.7 J	124	102
Selenium	0.24 U	0.23 UJ	0.43 J	0.73 J	0.38 J	0.42 J	0.8	0.22 UJ
Silver	0.086 U	0.083 U	0.092 U	0.13 U	0.097 J	0.093 U	0.092 U	1.1
Sodium	30.8 U	73.1 U	129 U	46.9 U	39.8 U	38.5 U	102 U	62.2 U
Thallium	0.35 UJ	0.34 UJ	0.38 UJ	0.55 UJ	0.36 UJ	0.38 UJ	0.38 UJ	0.33 UJ
Vanadium	3.3	4.1	7.6	16.6	12.4 J	4.8	5.6	9.1
Zinc	0.9 U	3.5	6	4.8	4.3	2.8	1 J	25.2

Notes: U - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant concentration is estimated

APPENDIX F.1
ANALYTICAL RESULTS FOR LOAMY SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG19-00	BASE-BG29-00	BASE-BG40-00
SAMPLE DATE	7/14/00	7/12/00	7/16/00
METALS (mg/kg)			
Aluminum	5680	2070	17600 J
Antimony	0.2 U	0.2 UJ	0.6 J
Arsenic	0.83 J	0.27 U	1.3 J
Barium	15.2	5.9	15.7
Beryllium	0.075 J	0.038 U	0.53 J
Cadmium	0.021 U	0.021 U	0.033 U
Calcium	726	4210	80.5 J
Chromium	7.2	2.8	12.6
Cobalt	0.21 J	0.1 J	0.36 J
Copper	1.5	1.6	1.4
Iron	3280	1660	12200 J
Lead	11.7	3.8 J	8.7 J
Magnesium	193	92 J	226
Manganese	5.4 J	28	6.3
Mercury	0.1 U	0.027 UJ	0.11
Nickel	0.96	0.73 U	1.5
Potassium	135	58.9 J	133 J
Selenium	0.28 J	0.23 U	3.4
Silver	0.084 U	0.083 U	0.21 J
Sodium	82.3 U	50.8 U	159 U
Thallium	0.35 UJ	0.34 UJ	0.54 UJ
Vanadium	11.1	4.8	26.2
Zinc	5.2	5.7	2.1 J

Notes: U - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant concentration is estimated

APPENDIX F.2
STATISTICS FOR INORGANICS IN LOAMY SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Percent Non-Detect	Percent Detected	Frequency of Detection	Arithmatic Mean Positive Detects	Median Positive Detects
METALS (mg/kg)									
Aluminum	0	0	2040	17600 J	0%	100%	11/11	5552.7273	4730
Antimony	0.2 UJ	0.44 UJ	0.3 J	0.6 J	55%	45%	5/11	0.41	0.34
Arsenic	0.27 U	0.3 U	0.49 J	1.3 J	45%	55%	6/11	0.8283	0.78
Barium	0	0	3.9	20	0%	100%	11/11	12.3182	12
Beryllium	0.038 U	0.098 U	0.029 J	0.53 J	36%	64%	7/11	0.1461	0.077
Cadmium	0.021 U	0.033 U	0.056 J	0.056 J	91%	9%	1/11	0.056	0.056
Calcium	28.4 U	28.4 U	44.3 J	11500	9%	91%	10/11	2619.91	321.5
Chromium	0	0	2.3	12.6	0%	100%	11/11	5.7818	5
Cobalt	0.083 U	0.086 U	0.1 J	0.51 J	18%	82%	9/11	0.3078	0.31
Copper	0.84 U	0.84 U	0.33 J	5.8	9%	91%	10/11	1.86	1.6
Iron	0	0	251	12200 J	0%	100%	11/11	3920.0909	2910
Lead	0	0	3.2 J	26.8 J	0%	100%	11/11	9.3455	8.2
Magnesium	0	0	25.9 J	330	0%	100%	11/11	164.9364	131
Manganese	0	0	0.81 J	49	0%	100%	11/11	11.1464	5.4
Mercury	0.018 U	0.26 U	0.032 J	0.11	45%	55%	6/11	0.0593	0.056
Nickel	0.73 U	0.73 U	0.31 J	1.7	9%	91%	10/11	0.953	0.895
Potassium	0	0	35.9 J	168 J	0%	100%	11/11	105.9909	124
Selenium	0.22 UJ	0.24 U	0.28 J	3.4	36%	64%	7/11	0.92	0.43
Silver	0.083 U	0.13 U	0.097 J	1.1	73%	27%	3/11	0.469	0.21
Sodium	30.8 U	159 U	0	0	100%	0%	0/11	---	----
Thallium	0.33 UJ	0.55 UJ	0	0	100%	0%	0/11	---	----
Vanadium	0	0	3.3	26.2	0%	100%	11/11	9.6	7.6
Zinc	0.9 U	0.9 U	1 J	25.2	9%	91%	10/11	6.06	4.55

APPENDIX F.2
STATISTICS FOR INORGANICS IN LOAMY SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Degree of Freedom	H Statistic	Log Upper 95% Confidence Level	Location of Maximum Detect
METALS (mg/kg)									
Aluminum	5552.7273	4492.0688	8007.5428	8.4053	0.6547	10	2.466	9229.5233	BASE-BG40-00
Antimony	0.2541	0.1737	0.349	-1.5853	0.6917	10	2.466	0.4463	BASE-BG40-00
Arsenic	0.5164	0.4128	0.742	-1.0178	0.9289	10	2.998	1.3421	BASE-BG40-00
Barium	12.3182	5.5083	15.3284	2.3993	0.5269	10	2.314	18.6095	BASE-BG16-00
Beryllium	0.1061	0.1449	0.1853	-2.7076	0.9032	10	2.998	0.2361	BASE-BG40-00
Cadmium	0.016	0.0134	0.0233	-4.293	0.4975	10	2.176	0.0218	BASE-BG16-00
Calcium	2383.0273	4053.8207	4598.3499	5.9409	2.2041	10	6.312	351293.5145	BASE-BG08-00
Chromium	5.7818	3.2323	7.5482	1.615	0.5571	10	2.314	8.8272	BASE-BG40-00
Cobalt	0.2595	0.1712	0.3531	-1.6562	0.9277	10	2.998	0.7072	BASE-BG15-00
Copper	1.7291	1.4864	2.5414	0.2594	0.8179	10	2.81	3.7459	BASE-BG16-00
Iron	3920.0909	3540.755	5855.0346	7.8587	1.0632	10	3.5	14774.2914	BASE-BG40-00
Lead	9.3455	6.5117	12.904	2.062	0.5982	10	2.314	14.5655	BASE-BG16-00
Magnesium	164.9364	98.0362	218.511	4.8812	0.7859	10	2.632	345.2031	BASE-BG16-00
Manganese	11.1464	14.7368	19.1997	1.7378	1.2264	10	3.5	46.8619	BASE-BG08-00
Mercury	0.0533	0.0374	0.0737	-3.1852	0.8027	10	2.81	0.1165	BASE-BG40-00
Nickel	0.8995	0.4913	1.168	-0.2601	0.6035	10	2.466	1.4809	BASE-BG12-00
Potassium	105.9909	47.5669	131.9852	4.5457	0.5424	10	2.314	162.3413	BASE-BG12-00
Selenium	0.6273	0.9509	1.1469	-1.0836	1.0712	10	3.5	1.9655	BASE-BG40-00
Silver	0.1617	0.3152	0.3339	-2.5854	1.0204	10	3.5	0.3924	BASE-BG16-00
Sodium	37.0182	20.501	48.2215	3.4818	0.5277	10	2.314	54.9915	
Thallium	0.1955	0.0391	0.2169	-1.6481	0.1788	10	1.86	0.2172	
Vanadium	9.6	6.8624	13.3501	2.0637	0.6431	10	2.466	15.9904	BASE-BG40-00
Zinc	5.55	6.7748	9.2523	1.2419	1.0397	10	3.5	18.7862	BASE-BG16-00

APPENDIX F.2
STATISTICS FOR INORGANICS IN LOAMY SURFACE SOILS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

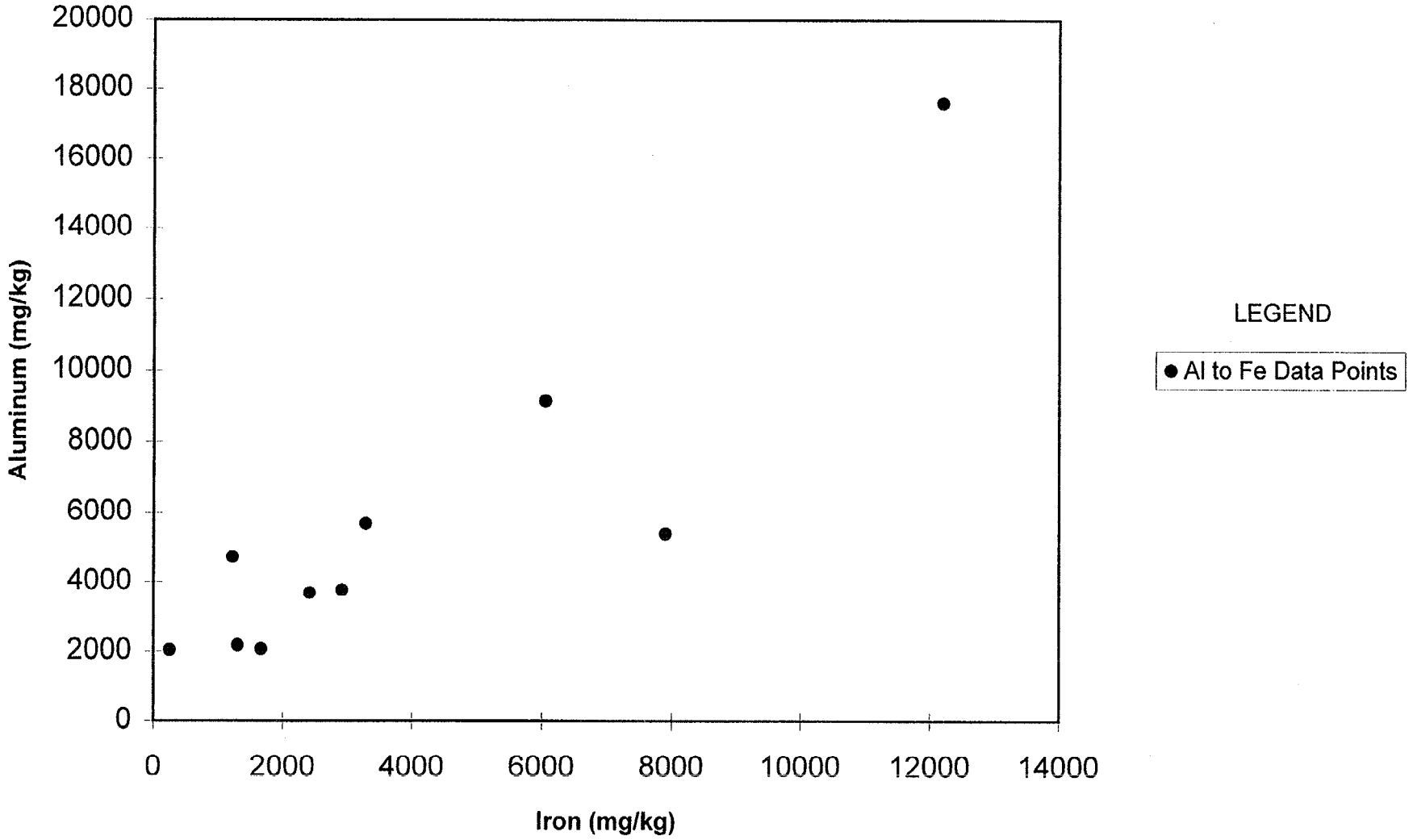
	Lognormal Distribution			Normal Distribution			Sample	Frequency
	W-Value	Quantile	True/False	W-Value	Quantile	True/False	Count	of Detection
METALS (mg/kg)								
Aluminum	0.921964616	0.85	TRUE	0.733521465	0.85	FALSE	11	11/11
Antimony	0.858087963	0.85	TRUE	0.850292468	0.85	TRUE	11	5/11
Arsenic	0.819542796	0.85	FALSE	0.860076317	0.85	TRUE	11	6/11
Barium	0.929090568	0.85	TRUE	0.949554014	0.85	TRUE	11	11/11
Beryllium	0.931890793	0.85	TRUE	0.566673576	0.85	FALSE	11	7/11
Cadmium	0.587418585	0.85	FALSE	0.465584857	0.85	FALSE	11	1/11
Calcium	0.941625372	0.85	TRUE	0.651337507	0.85	FALSE	11	10/11
Chromium	0.957339123	0.85	TRUE	0.911302648	0.85	TRUE	11	11/11
Cobalt	0.86500979	0.85	TRUE	0.916965035	0.85	TRUE	11	9/11
Copper	0.905838459	0.85	TRUE	0.728758087	0.85	FALSE	11	10/11
Iron	0.955883864	0.85	TRUE	0.857235908	0.85	TRUE	11	11/11
Lead	0.96197756	0.85	TRUE	0.777751339	0.85	FALSE	11	11/11
Magnesium	0.915817461	0.85	TRUE	0.962457981	0.85	TRUE	11	11/11
Manganese	0.976713378	0.85	TRUE	0.701098163	0.85	FALSE	11	11/11
Mercury	0.94940065	0.85	TRUE	0.895376361	0.85	TRUE	11	6/11
Nickel	0.931491783	0.85	TRUE	0.925235827	0.85	TRUE	11	10/11
Potassium	0.873668262	0.85	TRUE	0.904315009	0.85	TRUE	11	11/11
Selenium	0.888399708	0.85	TRUE	0.566302867	0.85	FALSE	11	7/11
Silver	0.660386241	0.85	FALSE	0.444164474	0.85	FALSE	11	3/11
Sodium	0.964208293	0.85	TRUE	0.892188747	0.85	TRUE	11	0/11
Thallium	0.727314212	0.85	FALSE	0.687466351	0.85	FALSE	11	0/11
Vanadium	0.959411341	0.85	TRUE	0.835120417	0.85	FALSE	11	11/11
Zinc	0.938134163	0.85	TRUE	0.612513607	0.85	FALSE	11	10/11

APPENDIX F
GRAPH 1

BASE BACKGROUND SURFACE SOILS - LOAM/SILT

Scatter Plot

Aluminum vs Iron



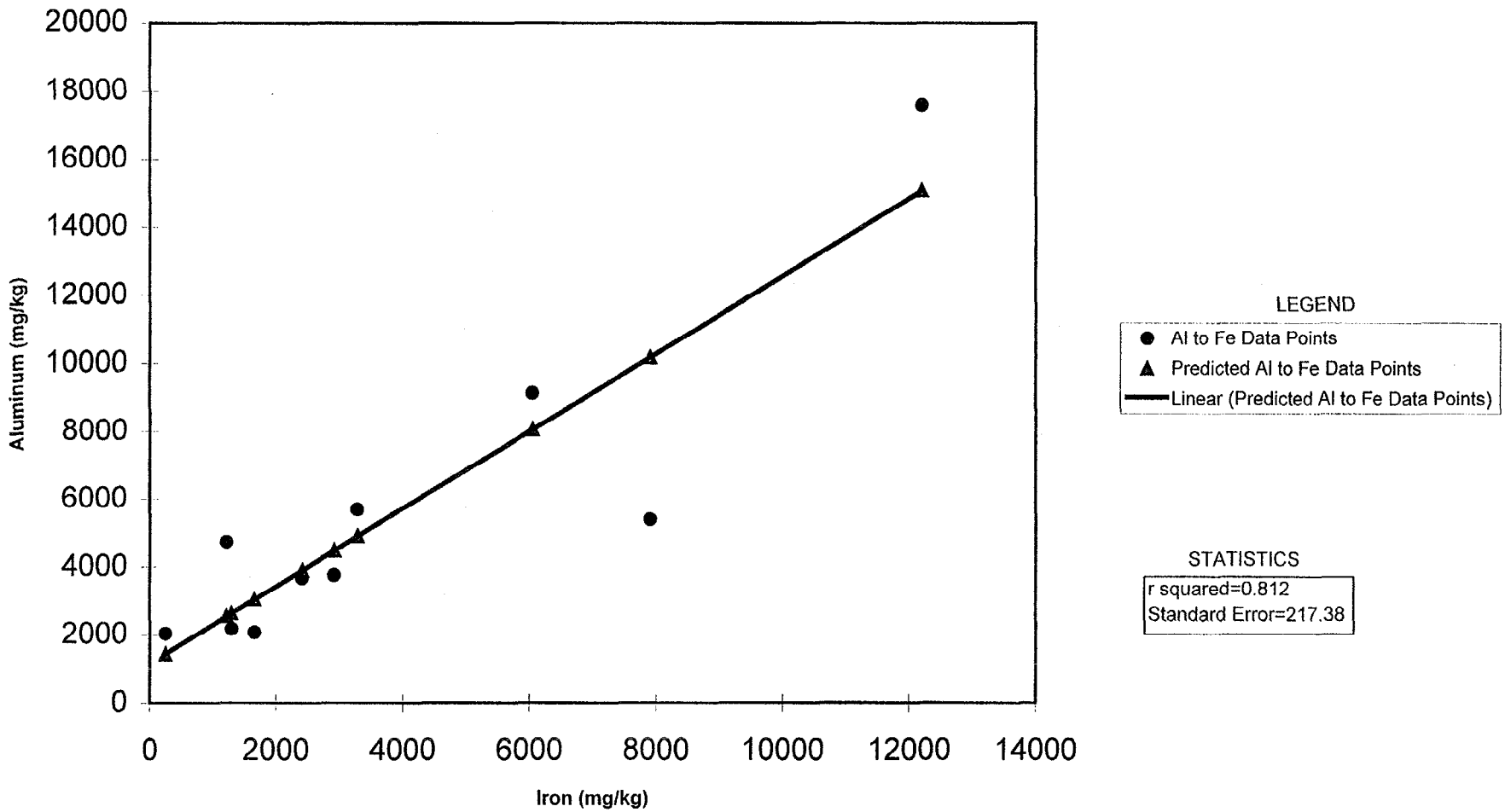
K:\62470\371phase\data\datatable\lejeunebackground\tables\basetables\newstats\regression\SS Loam-SiltRG\Al to Fe Chart 3

4/5/01

APPENDIX F
GRAPH 2

BASE BACKGROUND SURFACE SOILS - LOAM/SILT

Linear Regression
Aluminum vs Iron



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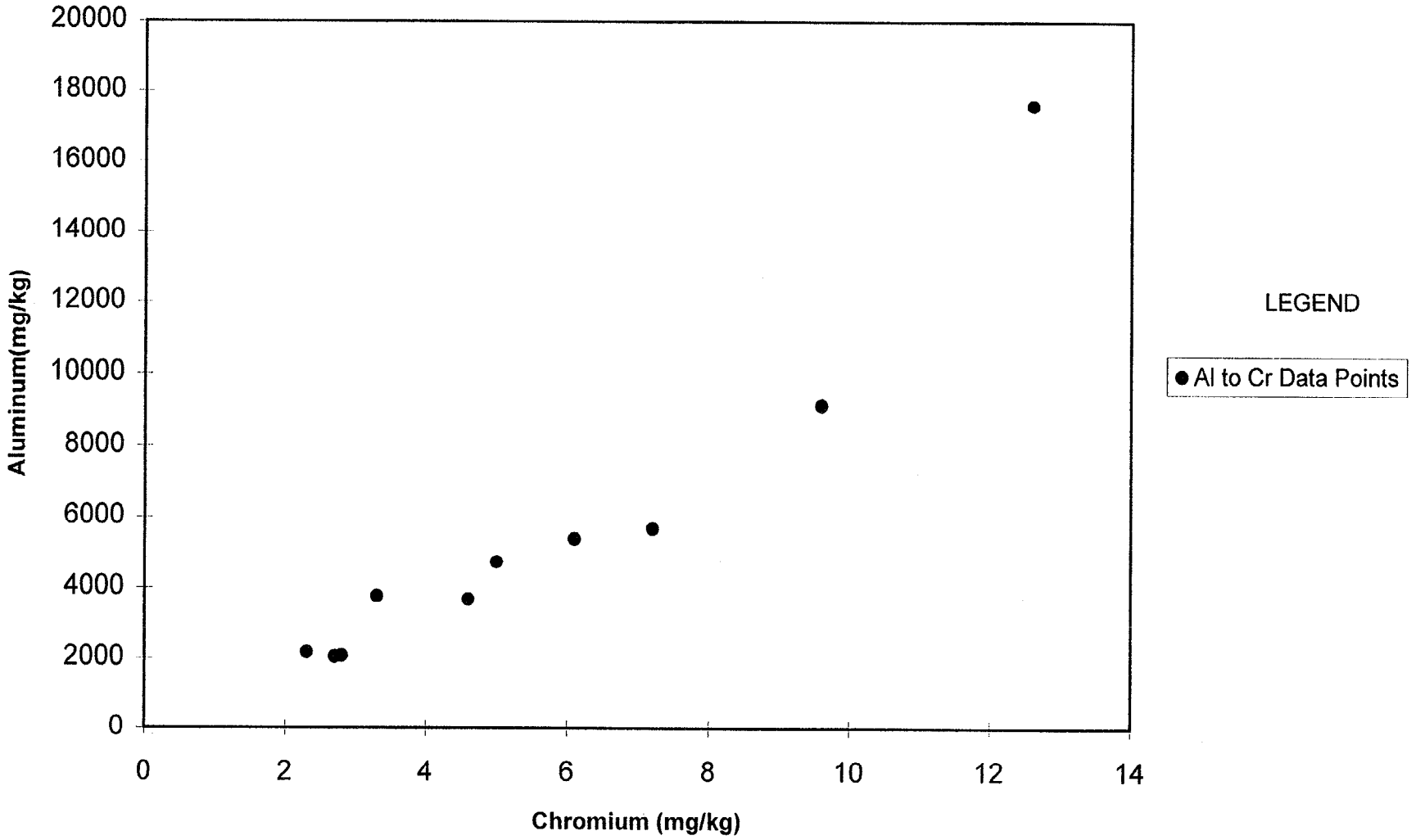
4/5/01

APPENDIX F
GRAPH 3

BASE BACKGROUND SURFACE SOILS - LOAM/SILT

Scatter Plot
Aluminum vs Chromium



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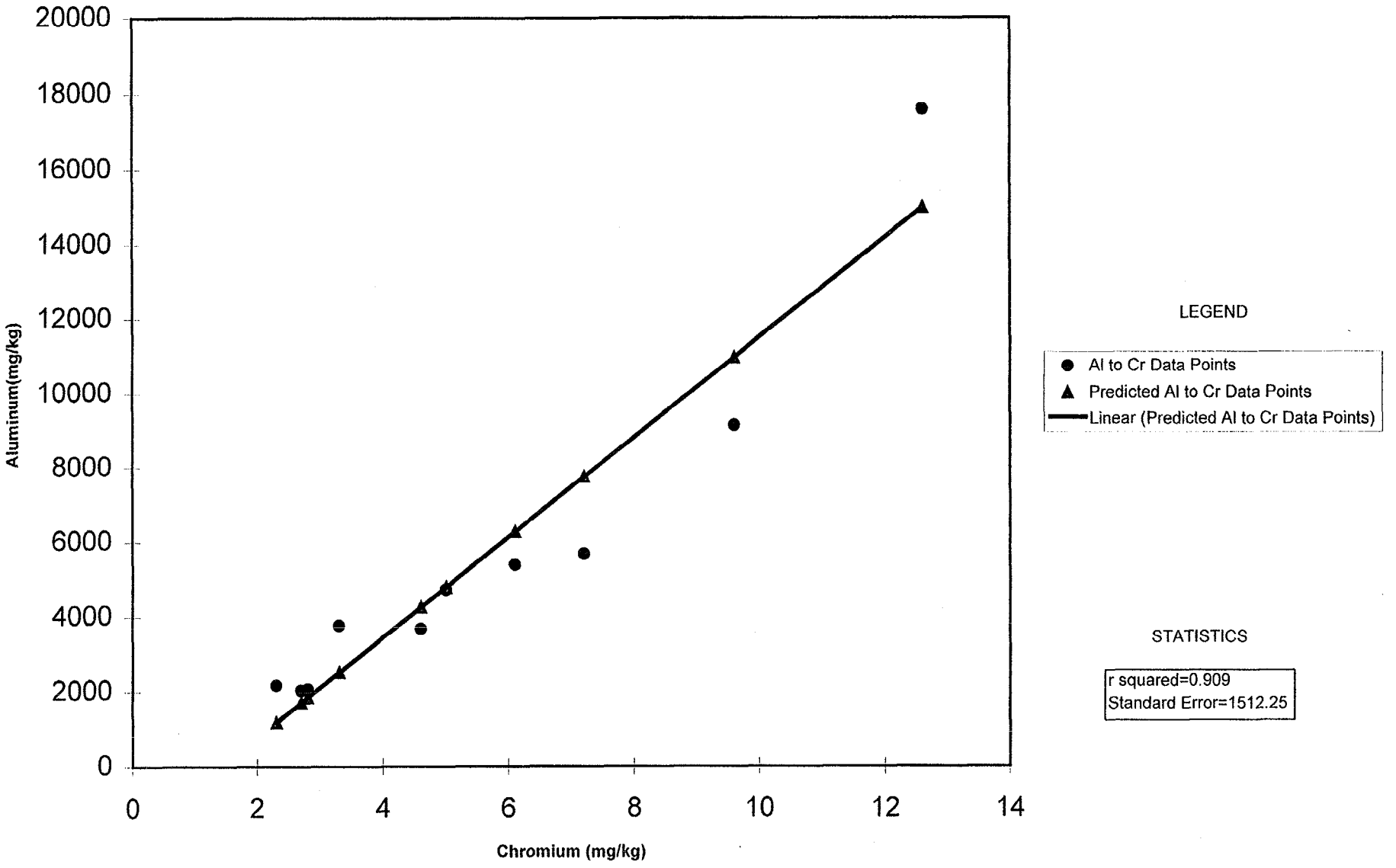
4/5/01

APPENDIX F
GRAPH 4

BASE BACKGROUND SURFACE SOILS - LOAM/SILT

Linear Regression
Aluminum vs Chromium



K:\62470\371phase\data\datatables\lejeunebackground\tables\basetables\newstats\regression\SS Loam-SiltRG\Al to Cr Chart 1

4/5/01

APPENDIX G
ANALYTICAL DATA AND STATISTICS FOR SUBSURFACE SANDS

APPENDIX G.1
ANALYTICAL RESULTS FOR SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG06-05	BASE-BG08-05	BASE-BG09-05	BASE-BG10-03	BASE-BG12-04	BASE-BG16-04	BASE-BG18-02	BASE-BG19-04	BASE-BG20-01
SAMPLE DATE	7/13/00	7/16/00	7/14/00	7/13/00	7/11/00	7/13/00	7/14/00	7/14/00	7/16/00
METALS (mg/kg)									
Aluminum	3330	1570 J	7640	1410	1740	1200	260 J	4620	4070 J
Antimony	0.2 UJ	0.41 J	0.22 U	0.35 J	0.21 UJ	0.23 U	0.2 UJ	0.21 U	0.23 UJ
Arsenic	1.1	0.3 U	0.3 U	0.27 U	0.29 U	0.32 U	0.28 U	0.88 J	0.31 U
Barium	18.2	3.4	7.9	2	3.9	3.2	1.2	5.3	10.4
Beryllium	0.069 U	0.012 U	0.097 J	0.028 J	0.035 U	0.024 J	0.011 U	0.058 J	0.062 J
Cadmium	0.021 U	0.023 U	0.023 U	0.021 U	0.022 U	0.024 U	0.022 U	0.022 U	0.024 U
Calcium	61.3 J	22.8 J	39.4 U	63.2 J	29.7 U	73.6 J	12.7 J	26.8 U	87.2 J
Chromium	5.2	3.2	7.5	1.6	1.8	1.6	0.83	5.3	7.8
Cobalt	0.1 J	0.092 U	0.35 J	0.083 U	0.11 J	0.098 U	0.087 U	0.14 J	0.21 J
Copper	1.4	0.48 U	0.72 U	0.3 U	0.24 J	0.31 U	0.43 U	0.7 U	0.95
Iron	2410	1130 J	1330	356	329	481	121 J	1580	840 J
Lead	3 J	2.5 J	5.1	1.9 J	1.9 J	1.8 J	1.3 J	3.3	5.1 J
Magnesium	78.1 J	63.3 J	214	46.9 J	44.7 J	38.5 J	16.8 J	130	144
Manganese	1.4	2	3.7 J	1.3 J	2	1.6 J	1.9	2 J	4.7
Mercury	0.028 UJ	0.029 J	0.055 U	0.027 U	0.022 J	0.027 U	0.019 U	0.047 U	0.031 J
Nickel	0.53 U	0.1 U	1.2	0.2 J	0.37 J	0.34 J	0.097 U	0.55 J	0.39 J
Potassium	66 J	57.9 J	292	32 J	53.6 J	31.8 J	17.6 J	130	176
Selenium	0.27 J	0.4 J	0.25 U	0.23 UJ	0.24 U	0.27 UJ	0.24 U	0.26 J	0.44 J
Silver	0.082 U	0.092 U	0.091 U	0.083 U	0.088 U	0.098 U	0.087 U	0.089 U	0.095 U
Sodium	49.6 U	102 U	51.2 U	64.6 U	34.7 U	71.3 U	80.2 U	44.6 U	116 U
Thallium	0.34 UJ	0.38 UJ	0.38 UJ	0.34 UJ	0.36 UJ	0.4 UJ	0.36 UJ	0.37 UJ	0.39 UJ
Vanadium	7.4	7.7	6.3	1.7 J	1.9 J	2.3 J	0.75 J	7.6	13.7
Zinc	2.4 U	0.28 U	4.2	1.2 U	1.6 U	1.3 U	0.26 U	1.5 J	0.33 J

Notes: U - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant Concentration is Estimated

APPENDIX G.1
ANALYTICAL RESULTS FOR SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG21-02	BASE-BG22-04	BASE-BG23-01	BASE-BG25-01	BASE-BG26-03	BASE-BG27--	BASE-BG30-01	BASE-BG31-04	BASE-BG33-02
SAMPLE DATE	7/15/00	7/14/00	7/11/00	7/14/00	7/14/00	7/14/00	7/12/00	7/16/00	7/14/00
METALS (mg/kg)									
Aluminum	8640	5810 J	9900	1340	3630	4640 J	3800	407	1100 J
Antimony	0.22 U	0.31 J	0.31 J	0.2 J	0.32 J	0.4 J	0.22 UJ	0.21 UJ	0.26 J
Arsenic	0.3 U	0.28 U	0.92 J	0.27 U	0.28 U	0.34 J	0.28 U	0.28 U	0.32 U
Barium	7.1	7.4	13.9	4	6.8	15.3	1.8	1.4	1.6
Beryllium	0.081 J	0.07 J	0.095 U	0.028 J	0.049 J	0.07 J	0.047 U	0.011 U	0.012 U
Cadmium	0.023 U	0.022 U	0.022 U	0.021 U	0.022 U	0.021 U	0.022 U	0.022 U	0.025 U
Calcium	38.5 U	41.6 J	499	83.8 J	44.2 U	71.3 J	14.5 U	21.3 J	9.1 U
Chromium	9.4	7.4	9.6 J	1.5	4.2	4.5	6.1	1	1.3
Cobalt	0.74	0.22 J	0.84	0.084 U	0.2 J	0.6	0.087 U	0.087 U	0.16 J
Copper	0.66 U	0.94 U	3.1	0.25 J	2.8	1.7	0.58	0.47 J	0.72 U
Iron	1770	877 J	4600	953	1530	3440 J	93.1	222	485 J
Lead	6	4.1 J	4 J	1.9	2.8	3.5 J	3.6 J	1.6	1.1 J
Magnesium	193	166	197	65.5 J	101 J	216	16.9 J	22.6 J	39 J
Manganese	5.9	2.8	4.5	2.2	2.4 J	7.1	0.75 J	1 J	2.3
Mercury	0.061	0.018 U	0.024 J	0.025 J	0.054 U	0.022 J	0.039	0.042 J	0.021 J
Nickel	1.9	0.37 J	3.6	0.44 J	0.95	1.6	0.26 J	0.098 U	0.64
Potassium	190	235	189	33.4 J	64.2 J	121	28.5 J	22.6 J	22.4 J
Selenium	0.25 U	0.24 J	0.24 U	0.23 U	0.24 U	0.32 J	0.31 J	0.24 U	0.29 J
Silver	0.092 U	0.086 U	0.087 U	0.084 U	0.087 U	0.085 U	0.087 U	0.087 U	0.1 U
Sodium	83.9 U	87.2 U	40.7 U	89.6 U	55 U	65.2 U	28.7 U	72.3 U	84.3 U
Thallium	0.38 UJ	0.36 UJ	0.36 UJ	0.34 UJ	0.36 UJ	0.35 UJ	0.36 UJ	0.36 U	0.41 UJ
Vanadium	7.1	8.6	11.7 J	2.4	5.4	8.9	3	1.1 J	1.4 J
Zinc	3.4	0.84 J	5.1	1.3 U	2.5	1.8 J	0.84 U	1.3 U	0.3 U

Notes: U - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant Concentration is Estimated

APPENDIX G.1
ANALYTICAL RESULTS FOR SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG34-03	BASE-BG35-01	BASE-BG36-01	BASE-BG37--	BASE-BG38-01	BASE-BG39-01	BASE-BG42-01	BASE-BG43-03	BASE-BG44-03
SAMPLE DATE	7/15/00	7/16/00	7/15/00	7/16/00	7/16/00	7/16/00	7/16/00	7/16/00	7/16/00
METALS (mg/kg)									
Aluminum	2200	1210 J	9670	3720 J	372	2470 J	3500	1620	6450
Antimony	0.28 J	0.23 J	0.2 U	0.22 UJ	0.23 UJ	0.27 J	0.22 UJ	0.2 UJ	0.26 UJ
Arsenic	0.27 U	0.28 U	1.4	0.3 U	0.32 U	0.31 U	0.37 J	0.27 U	0.3 U
Barium	4	3.2	12.7	4.2	0.67 J	4	5.9	1.8	8
Beryllium	0.038 J	0.015 J	0.068 J	0.012 U	0.012 U	0.013 J	0.054 J	0.01 U	0.04 J
Cadmium	0.021 U	0.021 U	0.021 U	0.023 U	0.025 U	0.024 U	0.023 U	0.021 U	0.023 U
Calcium	44.2 U	112	66.7 J	29.2 J	41.6 J	28 J	159	28.3 J	42.7 J
Chromium	2.5	1.4	13.2	4.4	1.2	2.7	2.2	1.7	7.1
Cobalt	0.24 J	0.085 U	1	0.23 J	0.098 U	0.14 J	0.092 U	0.11 J	0.26 J
Copper	0.53 U	0.67	1 U	0.43 U	0.23 J	0.44 U	3.3	1.2	0.75
Iron	624	715 J	4310	1380 J	81.5	626 J	1120	611	1720
Lead	1.4	1.7 J	5.2	2.6 J	1.6	2.2 J	3.5	1.5	3.2
Magnesium	86.3 J	54.8 J	209	106 J	13.5 J	87.1 J	87 J	30.1 J	167
Manganese	3.9 J	2.7	4.2 J	2	1.1 J	1.8	4.2	1.3	2.6
Mercury	0.053 U	0.025 J	0.081 U	0.026 J	0.06 J	0.021 J	0.061 J	0.055 J	0.054 J
Nickel	0.66	0.096 U	3	0.94	0.11 U	0.12 J	0.52 J	0.71	0.8
Potassium	51.1 J	37.2 J	124	66.9 J	16 J	44.8 J	31 J	22.4 J	121 J
Selenium	0.23 U	0.24 U	0.46 J	0.47 J	0.27 U	0.26 U	0.25 U	0.23 U	0.25 U
Silver	0.082 U	0.085 U	0.1 J	0.093 U	0.098 U	0.094 U	0.092 U	0.083 U	0.092 U
Sodium	64.7 U	101 U	57.5 U	97 U	92 U	80.1 U	90.3 U	80.8 U	98.7 U
Thallium	0.34 UJ	0.35 UJ	0.35 UJ	0.38 UJ	0.41 UJ	0.39 UJ	0.38 UJ	0.34 UJ	0.38 UJ
Vanadium	2.3	1.4 J	11.9	4.6	0.6 J	2.6	2 J	1.7 J	7.1
Zinc	1.1 J	0.26 U	2.3	0.28 U	2 U	0.28 U	7.9	2.1 U	4.2

Notes: U - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant Concentration is Estimated

APPENDIX G.1
ANALYTICAL RESULTS FOR SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG48-01	BASE-BG50-01
SAMPLE DATE	7/12/00	7/12/00
METALS (mg/kg)		
Aluminum	3640	4680
Antimony	0.4 UJ	0.35 UJ
Arsenic	0.28 U	0.3 U
Barium	1.8	3.3
Beryllium	0.041 U	0.035 U
Cadmium	0.022 U	0.023 U
Calcium	21.3 U	16.9 U
Chromium	6.1	6.1
Cobalt	0.086 U	0.41 J
Copper	0.52 J	0.17 U
Iron	251	1160
Lead	3.4 J	2.8 J
Magnesium	28.7 J	58.6 J
Manganese	1.1	3.7
Mercury	0.044	0.042
Nickel	0.51 J	2
Potassium	34.3 J	46.4 J
Selenium	0.32 J	0.25 U
Silver	0.086 U	0.092 U
Sodium	37.1 U	33.5 U
Thallium	0.36 UJ	0.38 UJ
Vanadium	3	6.4
Zinc	1.5 U	1.9 U

Notes: U - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant Concentration is Estimated

APPENDIX G.2
STATISTICS FOR INORGANICS IN SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID SAMPLE DATE	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Percent Non-Detect	Percent Detected	Frequency of Detection	Arithmatic Mean Positive Detects	Median Positive Detects	Arithmatic Mean Half Non-Detects
METALS (mg/kg)										
Aluminum	0	0	260 J	9900	0.00%	100.00%	29/29	3608.24	3500	3608.2414
Antimony	0.2 UJ	0.4 UJ	0.2 J	0.41 J	62.07%	37.93%	11/29	0.3	0.31	0.1881
Arsenic	0.27 U	0.32 U	0.34 J	1.4	79.31%	20.69%	6/29	0.84	0.9	0.2884
Barium	0	0	0.67 J	18.2	0.00%	100.00%	29/29	5.67	4	5.6679
Beryllium	0.005 U	0.0475 U	0.013 J	0.097 J	44.83%	55.17%	16/29	0.05	0.05	0.0343
Cadmium	0.0105 U	0.0125 U	0	0	100.00%	0.00%	0/29	0	0	0.0112
Calcium	9.1 U	44.2 U	12.7 J	499	34.48%	65.52%	19/29	81.33	61.3	58.1931
Chromium	0	0	0.83	13.2	0.00%	100.00%	29/29	4.43	4.2	4.4286
Cobalt	0.083 U	0.098 U	0.1 J	1	37.93%	62.07%	18/29	0.34	0.23	0.2258
Copper	0.17 U	1 U	0.23 J	3.3	48.28%	51.72%	15/29	1.21	0.75	0.7612
Iron	0	0	81.5	4600	0.00%	100.00%	29/29	1211.92	877	1211.9172
Lead	0	0	1.1 J	6	0.00%	100.00%	29/29	2.88	2.8	2.8828
Magnesium	0	0	13.5 J	216	0.00%	100.00%	29/29	93.84	78.1	93.8414
Manganese	0	0	0.75 J	7.1	0.00%	100.00%	29/29	2.69	2.2	2.6948
Mercury	0.018 U	0.081 U	0.021 J	0.061 J	34.48%	65.52%	19/29	0.04	0.03	0.0313
Nickel	0.096 U	0.53 U	0.12 J	3.6	20.69%	79.31%	23/29	0.96	0.64	0.7788
Potassium	0	0	16 J	292	0.00%	100.00%	29/29	81.31	51.1	81.3138
Selenium	0.23 U	0.27 U	0.24 J	0.47 J	62.07%	37.93%	11/29	0.34	0.32	0.2064
Silver	0.082 U	0.1 U	0.1 J	0.1 J	96.55%	3.45%	1/29	0.1	0.1	0.0465
Sodium	28.7 U	116 U	0	0	100.00%	0.00%	0/29	0	0	35.4103
Thallium	0.34 UJ	0.41 UJ	0	0	100.00%	0.00%	0/29	0	0	0.1838
Vanadium	0	0	0.6 J	13.7	0.00%	100.00%	29/29	4.92	3	4.9155
Zinc	0.26 U	2.4 U	0.33 J	7.9	58.62%	41.38%	12/29	2.93	2.4	1.5421

APPENDIX G.2
STATISTICS FOR INORGANICS IN SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

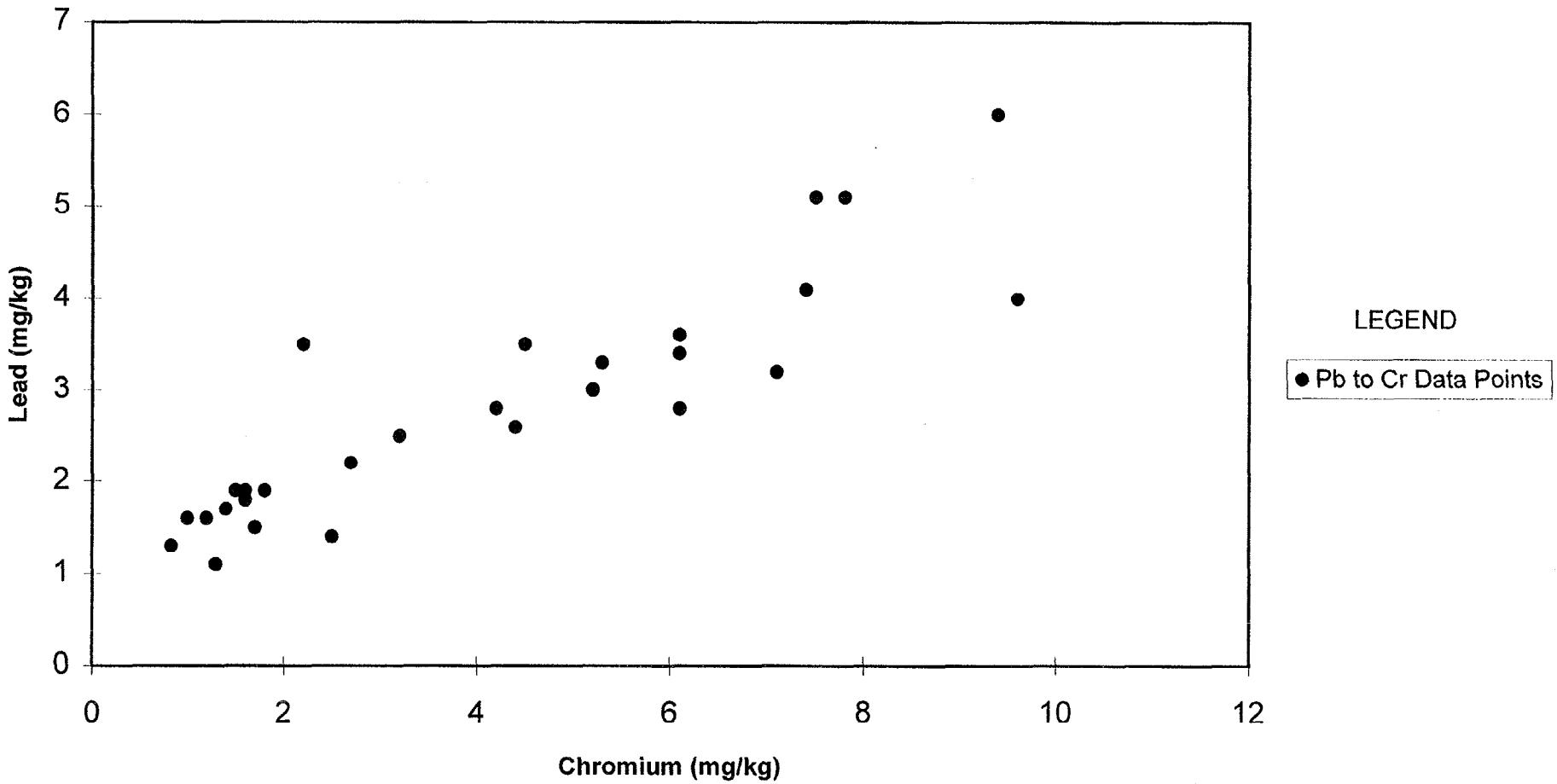
SAMPLE ID SAMPLE DATE	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Degree of Freedom	H Statistic	Log Upper 95% Confidence Level	Location of Maximum Detect
METALS (mg/kg)								
Aluminum	2732.3869	4471.3804	7.84	0.95	28	2.456	6233.7317	BASE-BG23-01
Antimony	0.1021	0.2204	-1.8	0.51	28	2.027	0.2281	BASE-BG08-05
Arsenic	0.3339	0.3939	-1.59	0.71	28	2.225	0.3544	BASE-BG36-01
Barium	4.5551	7.1068	1.43	0.83	28	2.337	8.4438	BASE-BG06-05
Beryllium	0.0264	0.0426	-3.75	0.97	28	2.456	0.0589	BASE-BG09-05
Cadmium	0.0006	0.0114	-4.49	0.05	28	1.706	0.0114	
Calcium	92.0399	87.2678	3.49	1.02	28	2.779	93.9328	BASE-BG23-01
Chromium	3.1688	5.4296	1.21	0.79	28	2.225	6.382	BASE-BG36-01
Cobalt	0.2575	0.3071	-2.02	1.04	28	2.779	0.3909	BASE-BG36-01
Copper	0.8869	1.0414	-0.75	0.94	28	2.456	1.1403	BASE-BG42-01
Iron	1167.3471	1580.6728	6.65	1.05	28	2.779	2322.2419	BASE-BG23-01
Lead	1.3194	3.2996	0.96	0.46	28	1.942	3.4347	BASE-BG21-02
Magnesium	66.8039	114.9442	4.25	0.83	28	2.337	143.0148	BASE-BG27--
Manganese	1.5508	3.1847	0.84	0.56	28	2.027	3.368	BASE-BG27--
Mercury	0.0156	0.0362	-3.59	0.53	28	2.027	0.0389	BASE-BG21-02,BASE-BG42-01
Nickel	0.8769	1.0558	-0.87	1.25	28	3.13	1.9201	BASE-BG23-01
Potassium	72.8531	104.3275	4.05	0.83	28	2.337	117.3677	BASE-BG09-05
Selenium	0.1202	0.2444	-1.72	0.52	28	2.027	0.2501	BASE-BG37--
Silver	0.0106	0.0498	-3.08	0.16	28	1.749	0.0489	BASE-BG36-01
Sodium	11.9668	39.1905	3.5	0.38	28	1.867	40.8916	
Thallium	0.0103	0.1871	-1.7	0.06	28	1.706	0.1871	
Vanadium	3.6975	6.0835	1.27	0.87	28	2.337	7.6219	BASE-BG20-01
Zinc	1.8217	2.1176	-0.19	1.2	28	2.779	3.1667	BASE-BG42-01

APPENDIX G.2
STATISTICS FOR INORGANICS IN SUBSURFACE SANDS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	Lognormal Distribution			Normal Distribution			Sample	Frequency
SAMPLE DATE	W-Value	Quantile	True/False	W-Value	Quantile	True/False	Count	of Detection
METALS (mg/kg)								
Aluminum	0.933592506	0.926	TRUE	0.896415236	0.926	FALSE	29	29/29
Antimony	0.818844509	0.926	FALSE	0.802853685	0.926	FALSE	29	11/29
Arsenic	0.589125702	0.926	FALSE	0.517039408	0.926	FALSE	29	6/29
Barium	0.976562565	0.926	TRUE	0.853947264	0.926	FALSE	29	29/29
Beryllium	0.902064066	0.926	FALSE	0.906065927	0.926	FALSE	29	16/29
Cadmium	0.884087341	0.926	FALSE	0.879935401	0.926	FALSE	29	0/29
Calcium	0.981102418	0.926	TRUE	0.506473022	0.926	FALSE	29	19/29
Chromium	0.941801922	0.926	TRUE	0.899637695	0.926	FALSE	29	29/29
Cobalt	0.887520432	0.926	FALSE	0.729019299	0.926	FALSE	29	18/29
Copper	0.941496737	0.926	TRUE	0.682266928	0.926	FALSE	29	15/29
Iron	0.963180256	0.926	TRUE	0.797639898	0.926	FALSE	29	29/29
Lead	0.964919372	0.926	TRUE	0.927143611	0.926	TRUE	29	29/29
Magnesium	0.943697991	0.926	TRUE	0.886604588	0.926	FALSE	29	29/29
Manganese	0.97953119	0.926	TRUE	0.897536926	0.926	FALSE	29	29/29
Mercury	0.945876382	0.926	TRUE	0.909861669	0.926	FALSE	29	19/29
Nickel	0.934313986	0.926	TRUE	0.764146971	0.926	FALSE	29	23/29
Potassium	0.941067812	0.926	TRUE	0.800122055	0.926	FALSE	29	29/29
Selenium	0.759666777	0.926	FALSE	0.743176862	0.926	FALSE	29	11/29
Silver	0.499934524	0.926	FALSE	0.391269437	0.926	FALSE	29	1/29
Sodium	0.925174801	0.926	FALSE	0.960128557	0.926	TRUE	29	0/29
Thallium	0.922603738	0.926	FALSE	0.919138941	0.926	FALSE	29	0/29
Vanadium	0.945728316	0.926	TRUE	0.890005228	0.926	FALSE	29	29/29
Zinc	0.940358174	0.926	TRUE	0.744572273	0.926	FALSE	29	12/29

APPENDIX G
GRAPH 1

BASE BACKGROUND SUBSURFACE SAND
Scatter Plot
Lead vs Chromium



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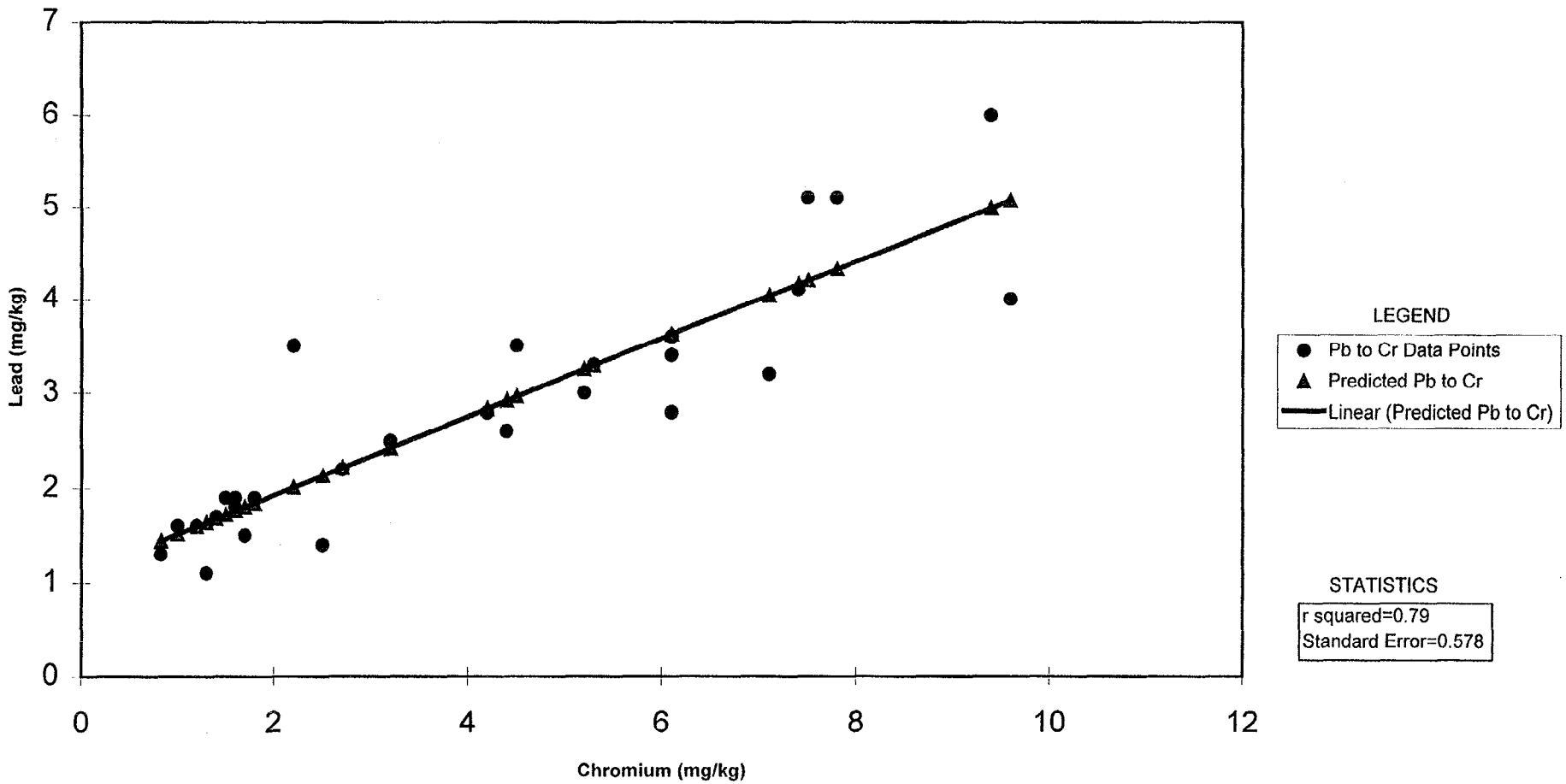
APPENDIX G
GRAPH 2

BASE BACKGROUND SUBSURFACE SAND

Linear Regression

Lead vs Chromium



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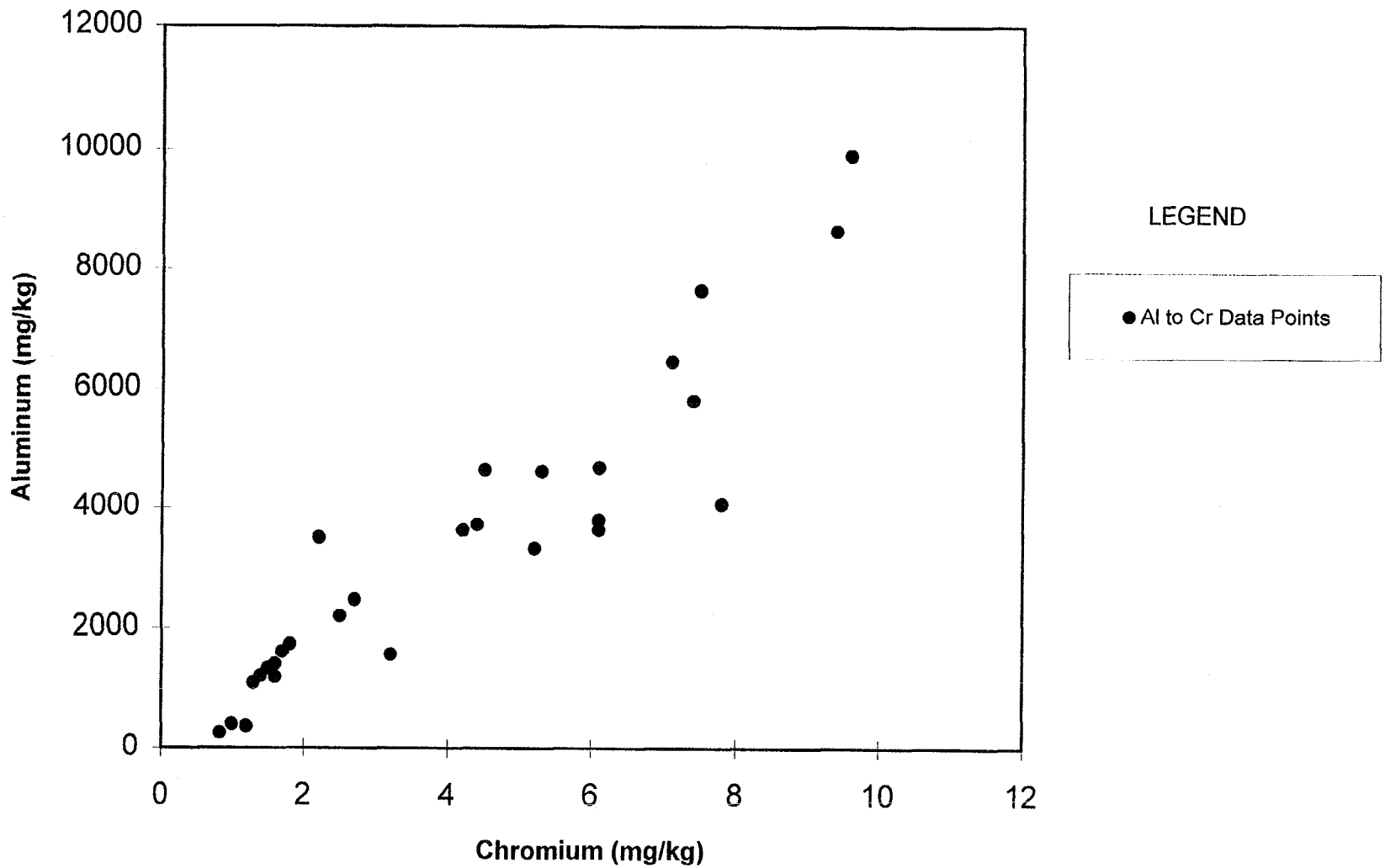
4/5/01

APPENDIX G
GRAPH 3

BASE BACKGROUND SUBSURFACE SAND

Scatter Plot

Aluminum vs Chromium



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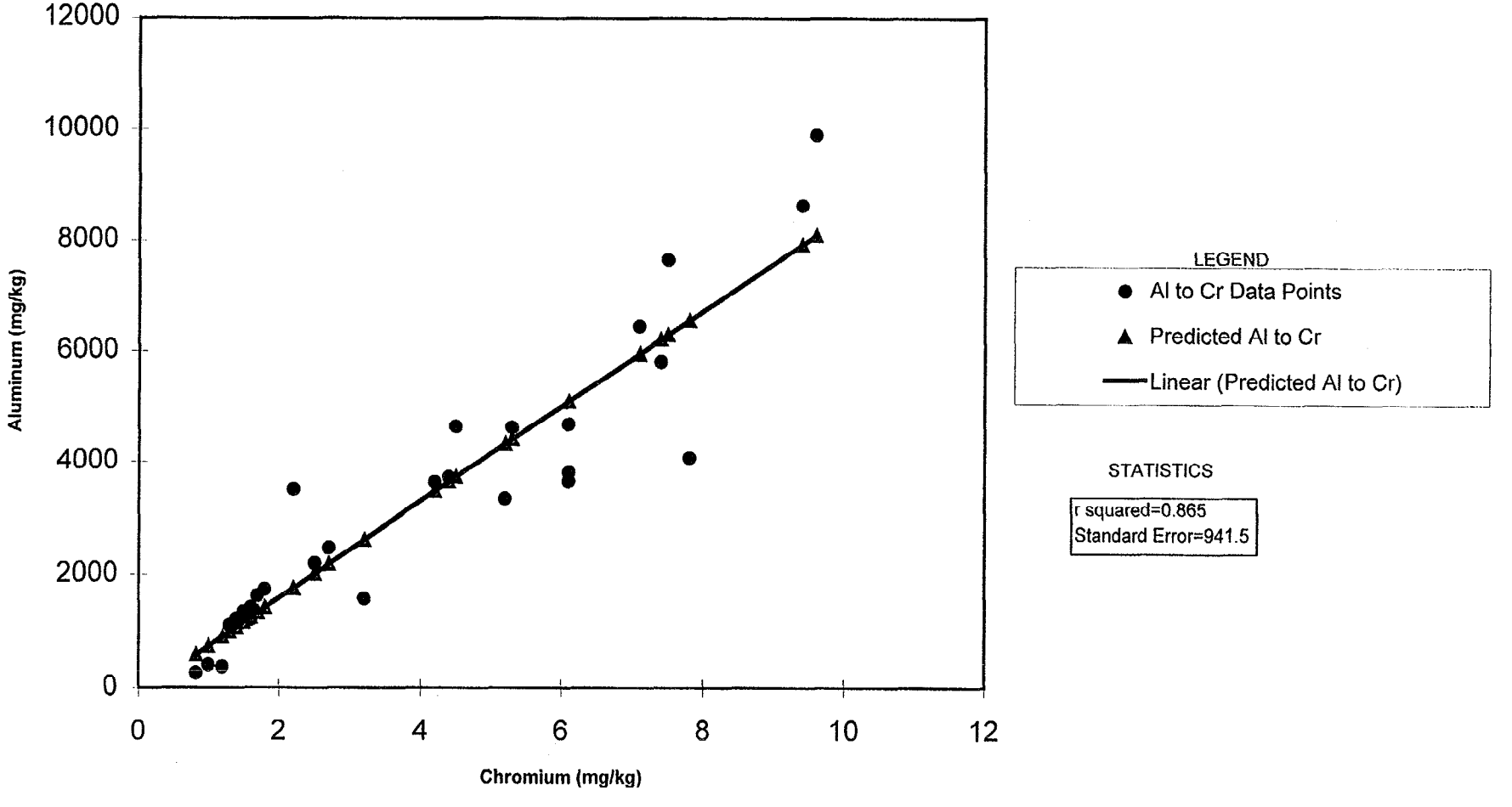
APPENDIX G
GRAPH 4

BASE BACKGROUND SUBSURFACE SAND

Linear Regression
Aluminum vs Chromium



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APPENDIX H
ANALYTICAL DATA AND STATISTICS FOR SILTS

APPENDIX H.1
ANALYTICAL RESULTS FOR SUBSURFACE SILTS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG01-02	BASE-BG04-02	BASE-BG14-01	BASE-BG24-01	BASE-BG28-02	BASE-BG29-02	BASE-BG32-03	BASE-BG40-01	BASE-BG41-01
SAMPLE DATE	7/11/00	7/11/00	7/12/00	7/13/00	7/15/00	7/12/00	7/15/00	7/16/00	7/15/00
METALS (mg/kg)									
Aluminum	2830	4660	4500	5260	16800	8160	2540	4780	3310
Antimony	0.25 UJ	0.43 UJ	0.34 UJ	0.22 U	0.47 J	0.23 UJ	0.24 U	0.23 UJ	0.24 U
Arsenic	0.29 U	0.3 U	0.29 U	0.31 U	1.9	0.42 J	0.32 U	0.32 U	0.43 J
Barium	5.2	10.5	15.6	3.2	23.1	16.6	0.92 J	5.7	3.1
Beryllium	0.057 U	0.069 U	0.1 U	0.023 J	0.15 J	0.12 U	0.16 J	0.036 J	0.046 J
Cadmium	0.022 U	0.023 U	0.022 U	0.024 U	0.023 U	0.024 U	0.025 U	0.025 U	0.025 U
Calcium	16.1 U	104 J	4950	13 U	557	98.7 J	35.6 U	37.3 J	82.6 J
Chromium	2.8	5.6	4.6	5.2	22.5	9.7	2.5	4.4	4.8
Cobalt	0.088 U	0.22 J	0.23 J	0.25 J	0.68	0.43 J	0.14 J	0.41 J	0.099 U
Copper	0.16 U	0.44 J	1.2	0.43 U	3	1.9	1.6	0.59 J	0.48 U
Iron	322	1290	2720	1370	15600	4120	102	1440	776
Lead	3.1 J	5.2 J	8.7 J	2.6 J	8.1	6.2 J	1	2.6	3.3 J
Magnesium	62.3 J	151	190	55.2 J	525	266	12.3 U	123 J	24.4 J
Manganese	1.1	3	17.2	1 J	6.9 J	3.9	3.5 J	1.9	0.74 J
Mercury	0.041	0.03 J	0.027 J	0.051 U	0.057 U	0.026 UJ	0.067 U	0.085 J	0.072 U
Nickel	0.33 J	0.76	1	2	2.8	1.4	0.11 U	1.2	0.42 J
Potassium	45.7 J	131 J	102 J	33.6 J	434	264 J	17.2 U	63.5 J	17.4 J
Selenium	0.25 J	0.26 U	0.3 J	0.26 UJ	0.77	0.42 J	0.27 J	0.27 U	0.27 UJ
Silver	0.088 U	0.094 U	0.088 U	0.094 U	0.24 J	0.097 U	0.099 U	0.098 U	0.099 U
Sodium	29.2 U	38.4 U	45.6 U	62.8 U	59.4 U	53.3 U	59.5 U	87.3 U	59.9 U
Thallium	0.36 UJ	0.39 UJ	0.36 UJ	0.39 UJ	0.38 UJ	0.4 UJ	0.41 UJ	0.4 UJ	0.41 UJ
Vanadium	3	5.1	7.2	9.9	33.9	14	0.35 J	5.7	2 J
Zinc	2.1 U	2.9 U	6.9	1.3 U	7.4	6.1	0.31 U	2.6 U	1 U

Notes: U - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant concentration is estimated

APPENDIX H.1
ANALYTICAL RESULTS FOR SUBSURFACE SILTS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG45-01	BASE-BG46-02	BASE-BG49-02
SAMPLE DATE	7/17/00	7/13/00	7/12/00
METALS (mg/kg)			
Aluminum	4890	1450	9510
Antimony	0.22 UJ	0.23 U	0.23 UJ
Arsenic	3.2	0.32 U	2.6
Barium	5.7	1.4	12.1
Beryllium	0.042 J	0.039 J	0.22 J
Cadmium	0.023 U	0.025 U	0.024 U
Calcium	42 J	12.6 U	256
Chromium	9	1.9	15.9
Cobalt	0.13 J	0.098 U	0.39 J
Copper	0.72	0.27 U	2.2
Iron	2490	1250	6550
Lead	4.2	1.8 J	5.3 J
Magnesium	168	14.9 J	367
Manganese	2.6	0.57 J	5.7
Mercury	0.16 J	0.042 U	0.034 J
Nickel	0.5 J	0.13 J	0.97
Potassium	120 J	11.9 J	546 J
Selenium	0.26 U	0.27 UJ	0.27 U
Silver	0.093 U	0.098 U	0.12 J
Sodium	101 U	62 U	37 U
Thallium	0.38 UJ	0.41 UJ	0.4 UJ
Vanadium	6.6	3.2	17.1
Zinc	3.3	1 U	5

Notes: U - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant concentration is estimated

APPENDIX H.2
STATISTICS FOR INORGANICS IN SUBSURFACE SILTS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Percent Non-Detect	Percent Detected	Frequency of Detection	Arithmatic Mean Positive Detects	Median Positive Detects	Arithmatic Mean Half Non-Detects
METALS (mg/kg)										
Aluminum	0	0	1450	16800	0%	100%	12/12	5724.17	4720	5724.1667
Antimony	0.22 UJ	0.43 UJ	0.47 J	0.47 J	92%	8%	1/12	0.47	0.47	0.1583
Arsenic	0.29 U	0.32 U	0.42 J	3.2	58%	42%	5/12	1.71	1.9	0.8021
Barium	0	0	0.92 J	23.1	0%	100%	12/12	8.59	5.7	8.5933
Beryllium	0.057 U	0.12 U	0.023 J	0.22 J	33%	67%	8/12	0.09	0.04	0.0741
Cadmium	0.022 U	0.025 U	0	0	100%	0%	0/12	---	---	0.0119
Calcium	12.6 U	35.6 U	37.3 J	4950	33%	67%	8/12	765.95	101.35	513.8542
Chromium	0	0	1.9	22.5	0%	100%	12/12	7.41	5	7.4083
Cobalt	0.088 U	0.099 U	0.13 J	0.68	25%	75%	9/12	0.32	0.25	0.2519
Copper	0.16 U	0.48 U	0.44 J	3	33%	67%	8/12	1.46	1.4	1.0267
Iron	0	0	102	15600	0%	100%	12/12	3169.17	1405	3169.1667
Lead	0	0	1	8.7 J	0%	100%	12/12	4.34	3.75	4.3417
Magnesium	12.3 U	12.3 U	14.9 J	525	8%	92%	11/12	176.98	151	162.7458
Manganese	0	0	0.57 J	17.2	0%	100%	12/12	4.01	2.8	4.0092
Mercury	0.026 UJ	0.072 U	0.027 J	0.16 J	50%	50%	6/12	0.06	0.04	0.0445
Nickel	0.11 U	0.11 U	0.13 J	2.8	8%	92%	11/12	1.05	0.97	0.9638
Potassium	17.2 U	17.2 U	11.9 J	546 J	8%	92%	11/12	160.83	102	148.1417
Selenium	0.26 U	0.27 U	0.25 J	0.77	58%	42%	5/12	0.4	0.3	0.245
Silver	0.088 U	0.099 U	0.12 J	0.24 J	83%	17%	2/12	0.18	0.18	0.0695
Sodium	29.2 U	101 U	0	0	100%	0%	0/12	---	---	28.975
Thallium	0.36 UJ	0.41 UJ	0	0	100%	0%	0/12	---	---	0.1954
Vanadium	0	0	0.35 J	33.9	0%	100%	12/12	9	6.15	9.0042
Zinc	0.31 U	2.9 U	3.3	7.4	58%	42%	5/12	5.74	6.1	2.8588

APPENDIX H.2
STATISTICS FOR INORGANICS IN SUBSURFACE SILTS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Degree of Freedom	H Statistic	Log Upper 95% Confidence Level	Location of Maximum Detect
METALS (mg/kg)								
Aluminum	4155.8884	7878.6913	8.46	0.65	11	2.414	9257.8205	BASE-BG28-02
Antimony	0.103	0.2117	-1.95	0.43	11	2.141	0.2047	BASE-BG28-02
Arsenic	1.1044	1.3747	-1.01	1.23	11	3.389	2.7302	BASE-BG45-01
Barium	6.9917	12.218	1.77	1	11	3.389	26.9796	BASE-BG28-02
Beryllium	0.0646	0.1076	-2.88	0.73	11	2.57	0.1293	BASE-BG49-02
Cadmium	0.0006	0.0122	-4.43	0.05	11	1.775	0.0122	
Calcium	1405.8556	1242.6877	4.17	1.98	11	4.962	8819.2735	BASE-BG14-01
Chromium	6.1438	10.5934	1.74	0.74	11	2.57	13.2338	BASE-BG28-02
Cobalt	0.1938	0.3524	-1.72	0.93	11	2.915	0.6282	BASE-BG28-02
Copper	0.953	1.5208	-0.5	1.18	11	3.389	4.0806	BASE-BG28-02
Iron	4308.6104	5402.8665	7.36	1.33	11	3.896	18023.3789	BASE-BG28-02
Lead	2.4228	5.5977	1.3	0.63	11	2.414	7.1319	BASE-BG14-01
Magnesium	157.6166	244.4585	4.48	1.35	11	3.896	1079.3447	BASE-BG28-02
Manganese	4.6021	6.3951	0.92	1	11	3.389	11.545	BASE-BG14-01
Mercury	0.0404	0.0654	-3.35	0.65	11	2.414	0.0696	BASE-BG45-01
Nickel	0.8072	1.3823	-0.47	1.13	11	3.389	3.768	BASE-BG28-02
Potassium	176.4678	239.6274	4.27	1.36	11	3.896	887.9915	BASE-BG49-02
Selenium	0.1902	0.3436	-1.6	0.59	11	2.271	0.3617	BASE-BG28-02
Silver	0.0576	0.0994	-2.84	0.52	11	2.271	0.0957	BASE-BG28-02
Sodium	10.2078	34.267	3.31	0.35	11	2.026	36.1184	
Thallium	0.0089	0.2	-1.63	0.05	11	1.775	0.2003	
Vanadium	9.2441	13.7966	1.7	1.18	11	3.389	36.3914	BASE-BG28-02
Zinc	2.7509	4.2849	0.46	1.25	11	3.896	15.1923	BASE-BG28-02

APPENDIX H.2
STATISTICS FOR INORGANICS IN SUBSURFACE SILTS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

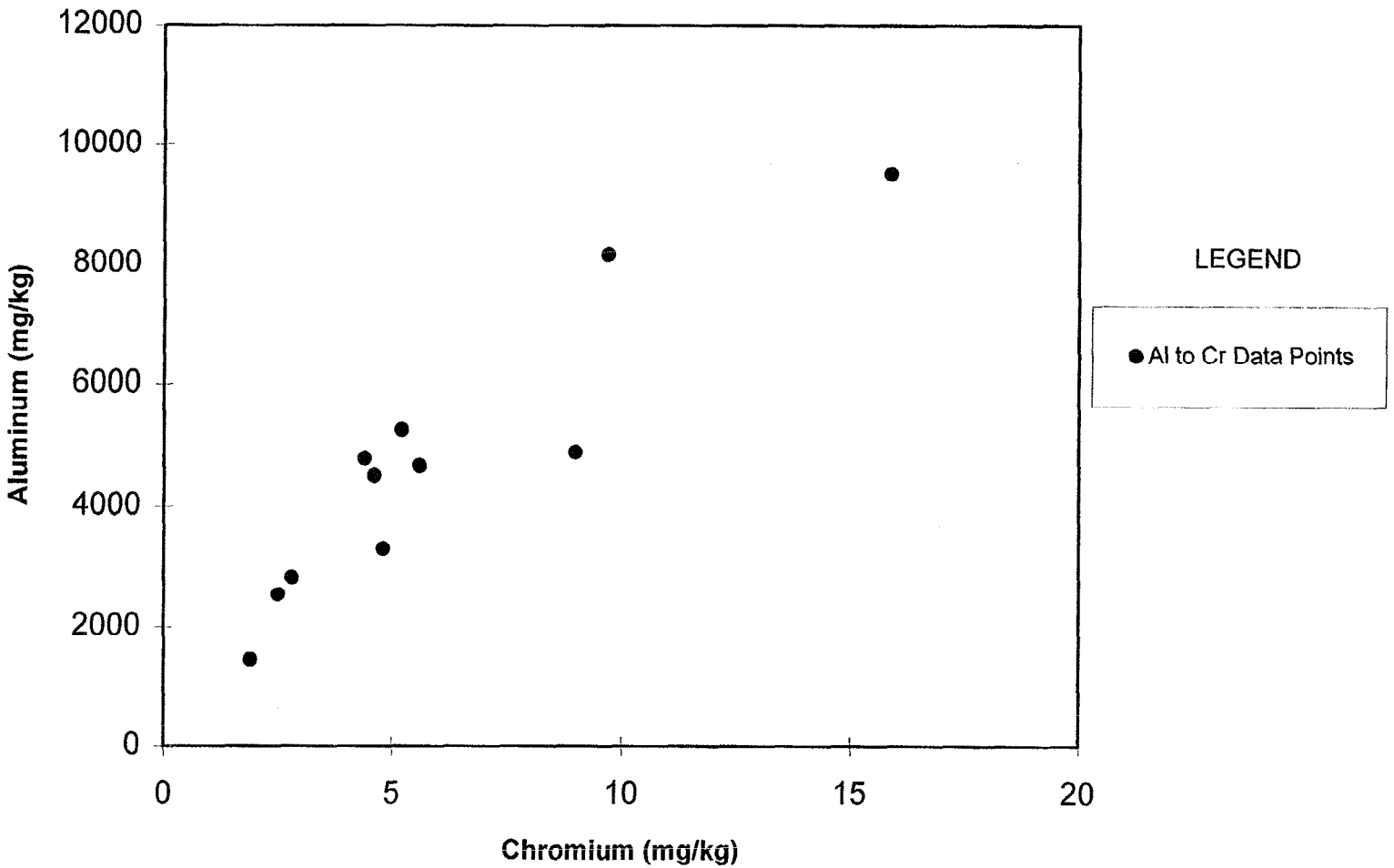
	Lognormal Distribution			Normal Distribution			Sample	Frequency
	W-Value	Quantile	True/False	W-Value	Quantile	True/False	Count	of Detection
METALS (mg/kg)								
Aluminum	0.972238174	0.859	TRUE	0.799105755	0.859	FALSE	12	12/12
Antimony	0.630569767	0.859	FALSE	0.52321617	0.859	FALSE	12	1/12
Arsenic	0.737935815	0.859	FALSE	0.656226765	0.859	FALSE	12	5/12
Barium	0.950682146	0.859	TRUE	0.902672966	0.859	TRUE	12	12/12
Beryllium	0.867957027	0.859	TRUE	0.733553815	0.859	FALSE	12	8/12
Cadmium	0.86815791	0.859	TRUE	0.868909013	0.859	TRUE	12	0/12
Calcium	0.932251918	0.859	TRUE	0.405314548	0.859	FALSE	12	8/12
Chromium	0.959768387	0.859	TRUE	0.796654485	0.859	FALSE	12	12/12
Cobalt	0.911725467	0.859	TRUE	0.903820321	0.859	TRUE	12	9/12
Copper	0.951875935	0.859	TRUE	0.88326228	0.859	TRUE	12	8/12
Iron	0.969985646	0.859	TRUE	0.668831964	0.859	FALSE	12	12/12
Lead	0.961876331	0.859	TRUE	0.943340168	0.859	TRUE	12	12/12
Magnesium	0.944125518	0.859	TRUE	0.877964338	0.859	TRUE	12	11/12
Manganese	0.973796799	0.859	TRUE	0.70986337	0.859	FALSE	12	12/12
Mercury	0.883349164	0.859	TRUE	0.642227652	0.859	FALSE	12	6/12
Nickel	0.937198909	0.859	TRUE	0.908559201	0.859	TRUE	12	11/12
Potassium	0.963278425	0.859	TRUE	0.777025461	0.859	FALSE	12	11/12
Selenium	0.775630468	0.859	FALSE	0.676103298	0.859	FALSE	12	5/12
Silver	0.559192238	0.859	FALSE	0.490474348	0.859	FALSE	12	2/12
Sodium	0.957241106	0.859	TRUE	0.920806987	0.859	TRUE	12	0/12
Thallium	0.873761349	0.859	TRUE	0.88020196	0.859	TRUE	12	0/12
Vanadium	0.947317114	0.859	TRUE	0.790232441	0.859	FALSE	12	12/12
Zinc	0.929424664	0.859	TRUE	0.829753578	0.859	FALSE	12	5/12

APPENDIX H
GRAPH 1

BASE BACKGROUND SUBSURFACE SILT

Scatter Plot

Aluminum vs Chromium



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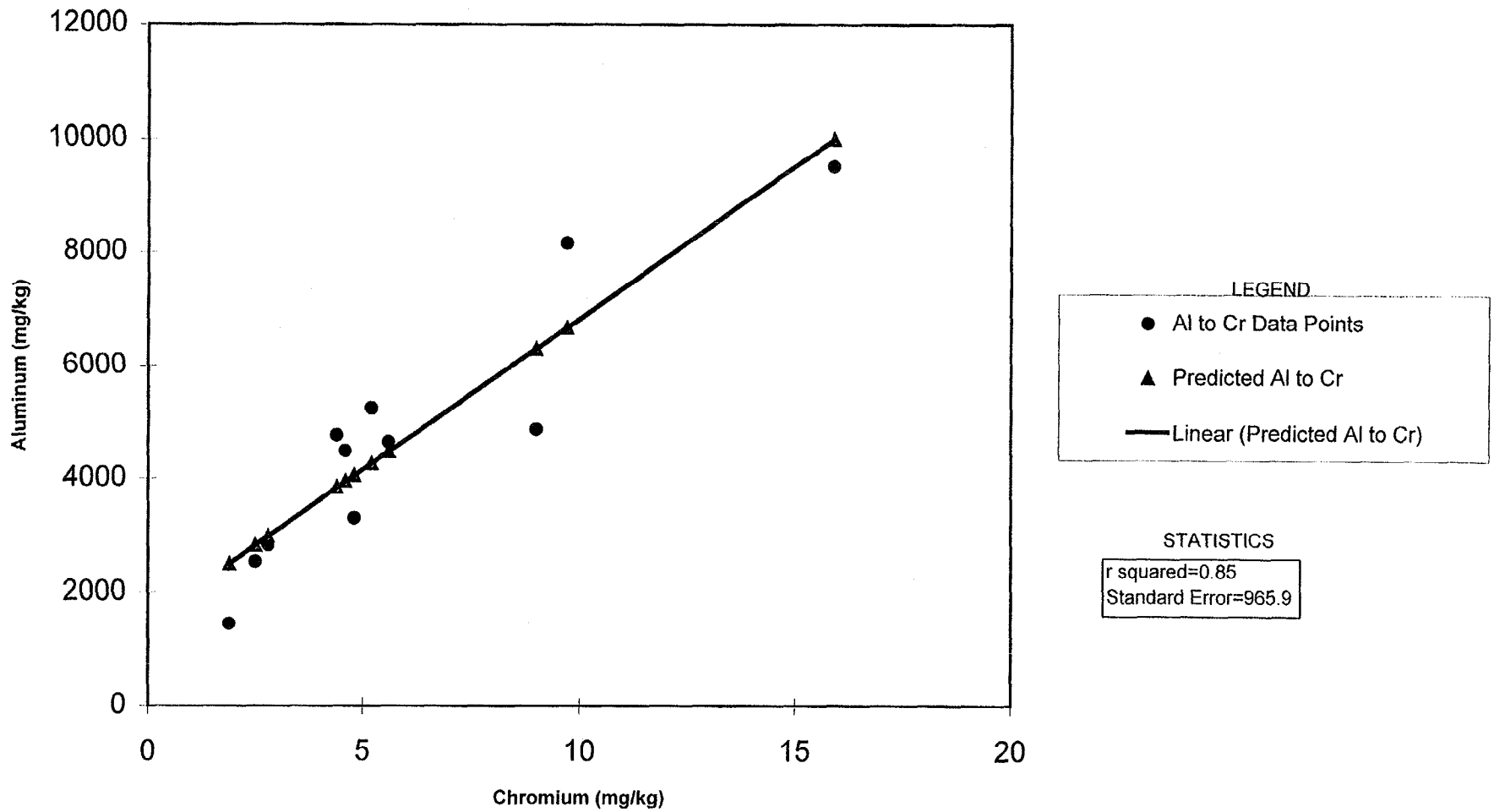
APPENDIX H
GRAPH 2

BASE BACKGROUND SUBSURFACE SILT

Linear Regression

Aluminum vs Chromium



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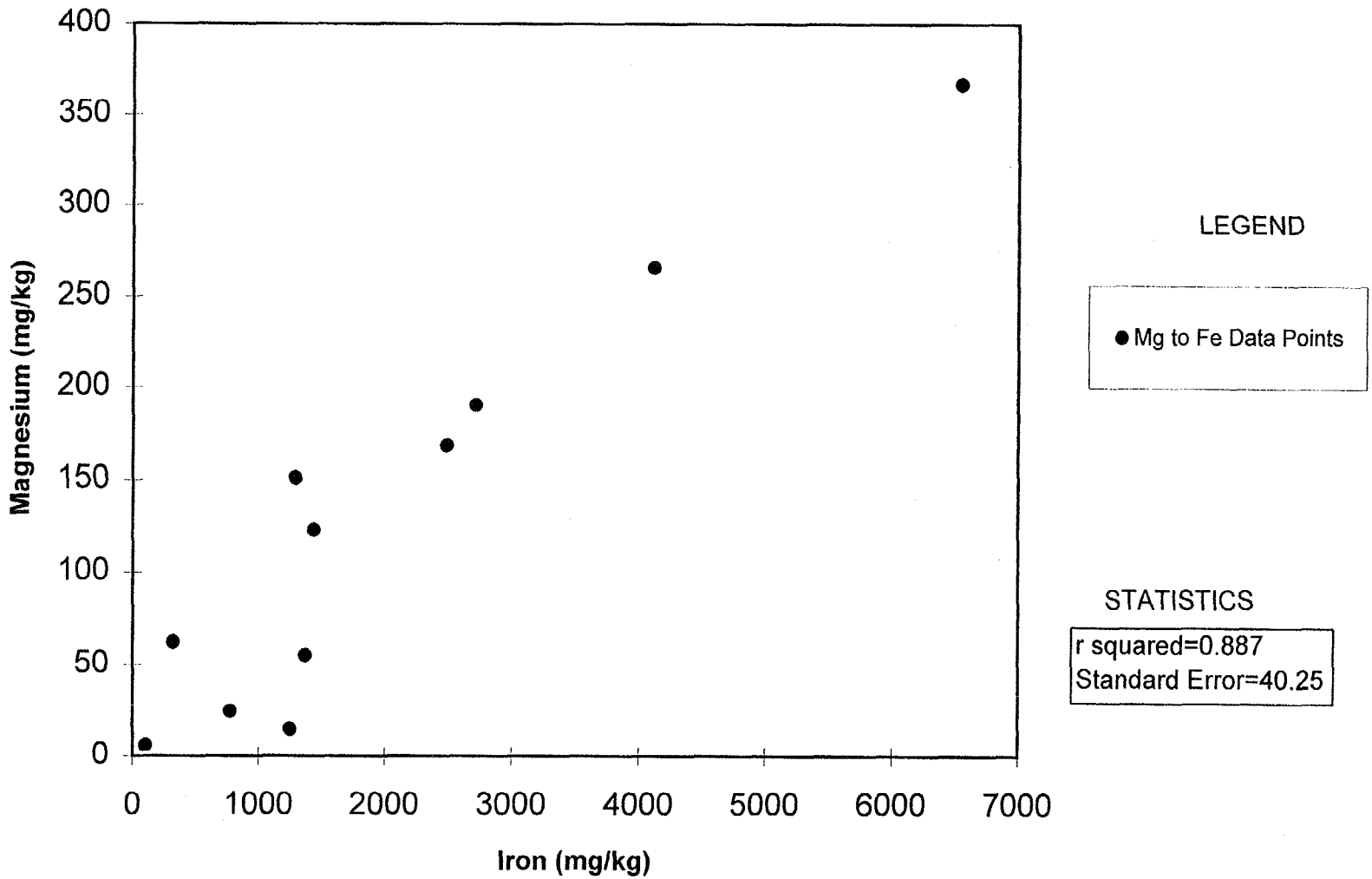
APPENDIX H
GRAPH 3

BASE BACKGROUND SUBSURFACE SILT

Scatter Plot

Magnesium vs Iron



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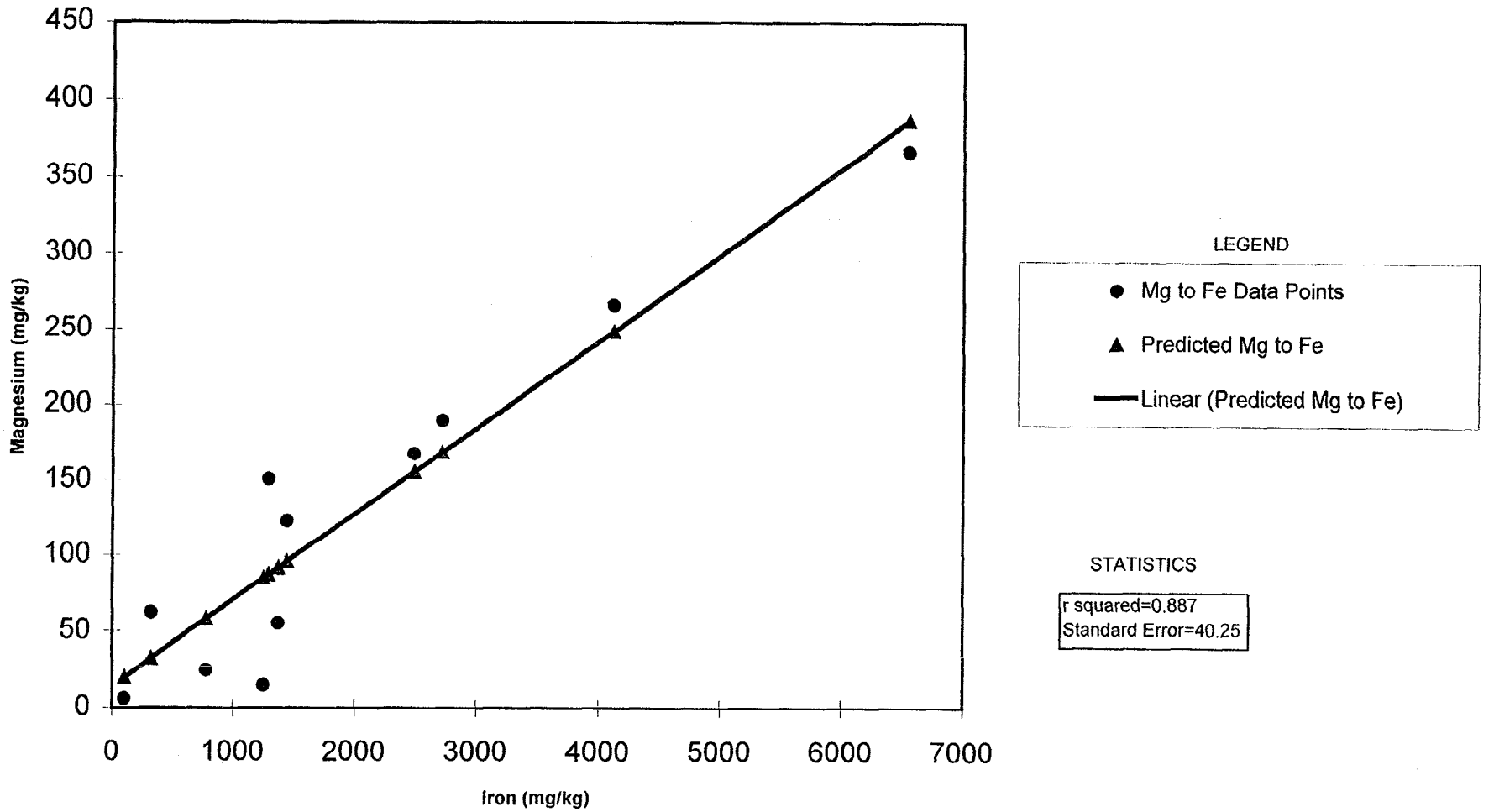
APPENDIX H
GRAPH 4

BASE BACKGROUND SUBSURFACE SILT

Linear Regression
Magnesium vs Iron



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APPENDIX I
ANALYTICAL DATA AND STATISTICS FOR CLAYS

APPENDIX I.1
ANALYTICAL RESULTS FOR SUBSURFACE CLAYS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG02-03	BASE-BG03-02	BASE-BG05-02	BASE-BG07-03	BASE-BG11-03	BASE-BG13-03	BASE-BG15-03	BASE-BG17-04	BASE-BG47-04
SAMPLE DATE	7/13/00	7/13/00	7/13/00	7/13/00	7/11/00	7/11/00	7/16/00	7/13/00	7/16/00
METALS (mg/kg)									
Aluminum	6000	10700	10900	6860	8800	14900	15600 J	6850	5290
Antimony	0.29 UJ	0.24 U	0.24 U	0.28 J	0.28 UJ	0.23 UJ	0.5 J	0.2 UJ	0.24 UJ
Arsenic	1 J	8.3	9.3	0.3 U	3.9	0.55 J	8.1	0.43 J	3.3
Barium	12.7	21.4	13.4	11.1	15.7	14.6	22.4	8.2	27.1
Beryllium	0.092 U	0.19 J	0.16 J	0.13 J	0.24 J	0.26 J	0.26 J	0.098 U	0.91
Cadmium	0.024 U	0.025 U	0.025 U	0.023 U	0.025 U	0.024 U	0.026 U	0.022 U	0.025 U
Calcium	235	172	1800	42.9 J	148	112 J	30.4 J	181	458
Chromium	13.2	20.8	19.3	9.3	22.6	15.9 J	23.3	9.3	11.3
Cobalt	0.14 J	0.47 J	0.46 J	1.1	0.32 J	0.67	0.71	0.32 J	6.8
Copper	1.8	3.6	3.9	1.8	4.2	3.2	3.5	0.85	6.7
Iron	3020	13300	14000	1450	5050	4100	12000 J	1420	8450
Lead	8.6 J	10.7 J	10.7 J	6.6 J	10 J	7.5 J	12.2 J	4.8 J	5.4
Magnesium	323	572	568	212	264	343	617	242	1250
Manganese	3.5	5.1 J	5.9 J	3.4 J	4.5	5.2	6.7	3	67.6
Mercury	0.032 UJ	0.09	0.045	0.036 U	0.044 J	0.02 U	0.036 J	0.032 UJ	0.059 J
Nickel	0.86	1.1	1.1	1.4	1.2	1.6	2	0.93	12.3
Potassium	303 J	565	518	275	869 J	644	784	269 J	668 J
Selenium	0.26 U	0.51 J	0.59 J	0.25 UJ	0.49 J	0.26 U	1.3	0.24 U	0.3 J
Silver	0.096 U	0.15 J	0.19 J	0.092 U	0.1 U	0.096 U	0.36 J	0.086 U	0.1 J
Sodium	68 U	86.2 U	63.8 U	98.3 U	41 U	47.1 U	140 U	56.6 U	66.4 U
Thallium	0.4 UJ	0.42 UJ	0.42 UJ	0.38 UJ	0.42 UJ	0.4 UJ	0.42 UJ	0.35 UJ	0.42 UJ
Vanadium	9.3	31.9	32	9.7	24.2	13.6 J	39	8.8	11.1
Zinc	4.2	6.4	6.5	4.3	4.8	11.8	6.4	3.1 U	39.7

Notes: U - Not Detected
mg/kg - Milligrams per Kilogram
J - Resultant concentration is estimated

APPENDIX I.2
STATISTICS FOR INORGANICS IN SUBSURFACE CLAYS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID SAMPLE DATE	Minimum Non-Detect	Maximum Non-Detect	Minimum Detected	Maximum Detected	Percent Non-Detect	Percent Detected	Frequency of Detection	Arithmatic Mean Positive Detects	Median Positive Detects
METALS (mg/kg)									
Aluminum	0	0	5290	15600 J	0%	100%	9/9	9544.44	8800
Antimony	0.2 UJ	0.29 UJ	0.28 J	0.5 J	78%	22%	2/9	0.39	0.39
Arsenic	0.3 U	0.3 U	0.43 J	9.3	11%	89%	8/9	4.36	3.6
Barium	0	0	8.2	27.1	0%	100%	9/9	16.29	14.6
Beryllium	0.092 U	0.098 U	0.13 J	0.91	22%	78%	7/9	0.31	0.24
Cadmium	0.022 U	0.026 U	0	0	100%	0%	0/9	---	---
Calcium	0	0	30.4 J	1800	0%	100%	9/9	353.26	172
Chromium	0	0	9.3	23.3	0%	100%	9/9	16.11	15.9
Cobalt	0	0	0.14 J	6.8	0%	100%	9/9	1.22	0.47
Copper	0	0	0.85	6.7	0%	100%	9/9	3.28	3.5
Iron	0	0	1420	14000	0%	100%	9/9	6976.67	5050
Lead	0	0	4.8 J	12.2 J	0%	100%	9/9	8.5	8.6
Magnesium	0	0	212	1250	0%	100%	9/9	487.89	343
Manganese	0	0	3	67.6	0%	100%	9/9	11.66	5.1
Mercury	0.02 U	0.036 U	0.036 J	0.09	44%	56%	5/9	0.05	0.05
Nickel	0	0	0.86	12.3	0%	100%	9/9	2.5	1.2
Potassium	0	0	269 J	869 J	0%	100%	9/9	543.89	565
Selenium	0.24 U	0.26 U	0.3 J	1.3	44%	56%	5/9	0.64	0.51
Silver	0.086 U	0.1 U	0.1 J	0.36 J	56%	44%	4/9	0.2	0.17
Sodium	41 U	140 U	0	0	100%	0%	0/9	---	---
Thallium	0.35 UJ	0.42 UJ	0	0	100%	0%	0/9	---	---
Vanadium	0	0	8.8	39	0%	100%	9/9	19.96	13.6
Zinc	3.1 U	3.1 U	4.2	39.7	11%	89%	8/9	10.51	6.4

APPENDIX I.2
STATISTICS FOR INORGANICS IN SUBSURFACE CLAYS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID SAMPLE DATE	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Degree of Freedom	H Statistic	Log Upper 95% Confidence Level	Location of Maximum Detect
METALS (mg/kg)									
Aluminum	9544.4444	3778.3664	11886.4627	9.1	0.39	8	2.134	12913.4833	BASE-BG15-03
Antimony	0.1822	0.1307	0.2632	-1.85	0.53	8	2.439	0.2829	BASE-BG15-03
Arsenic	3.8922	3.7459	6.2141	0.63	1.51	8	5.065	87.3252	BASE-BG05-02
Barium	16.2889	6.0944	20.0665	2.73	0.38	8	2.134	21.8191	BASE-BG47-04
Beryllium	0.2494	0.2608	0.4111	-1.76	0.91	8	3.239	0.739	BASE-BG47-04
Cadmium	0.0122	0.0006	0.0126	-4.41	0.05	8	1.822	0.0126	
Calcium	353.2556	556.9382	698.4734	5.15	1.21	8	3.82	1830.3975	BASE-BG05-02
Chromium	16.1111	5.5945	19.5788	2.72	0.37	8	2.134	21.4891	BASE-BG15-03
Cobalt	1.2211	2.1107	2.5294	-0.5	1.08	8	3.82	4.675	BASE-BG47-04
Copper	3.2833	1.7092	4.3427	1.05	0.61	8	2.618	6.0244	BASE-BG47-04
Iron	6976.6667	5071.728	10120.3745	8.54	0.9	8	3.021	20042.5346	BASE-BG05-02
Lead	8.5	2.587	10.1036	2.09	0.33	8	2.134	10.9704	BASE-BG15-03
Magnesium	487.8889	325.1651	689.4423	6.03	0.57	8	2.439	803.3315	BASE-BG47-04
Manganese	11.6556	21.0146	24.6815	1.81	0.94	8	3.239	27.8748	BASE-BG47-04
Mercury	0.0371	0.0259	0.0532	-3.52	0.73	8	2.813	0.0799	BASE-BG03-02
Nickel	2.4989	3.6925	4.7877	0.46	0.81	8	3.021	5.2514	BASE-BG47-04
Potassium	543.8889	222.4255	681.7592	6.21	0.46	8	2.277	799.585	BASE-BG11-03
Selenium	0.4106	0.3833	0.6482	-1.24	0.88	8	3.021	1.0834	BASE-BG15-03
Silver	0.115	0.1062	0.1808	-2.46	0.78	8	2.813	0.2501	BASE-BG15-03
Sodium	37.0778	15.2154	46.5091	3.55	0.38	8	2.134	49.5332	
Thallium	0.2017	0.0122	0.2093	-1.6	0.06	8	1.822	0.2101	
Vanadium	19.9556	11.8871	27.3238	2.83	0.61	8	2.618	35.7782	BASE-BG15-03
Zinc	9.5167	11.651	16.7386	1.85	0.88	8	3.021	23.7327	BASE-BG47-04

APPENDIX I.2
STATISTICS FOR INORGANICS IN SUBSURFACE CLAYS
BASE BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

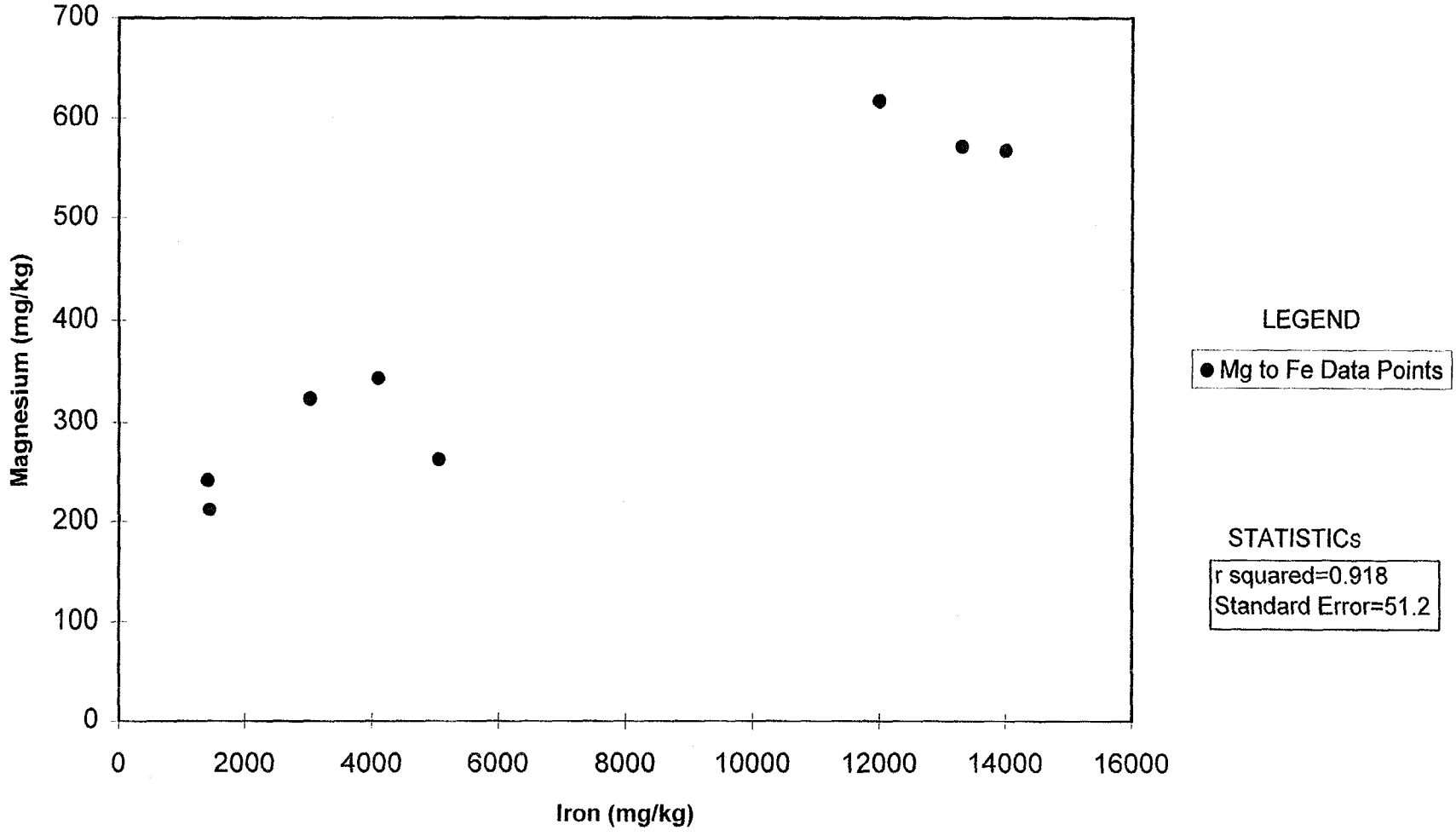
SAMPLE ID	Lognormal Distribution			Normal Distribution			Sample	Frequency
SAMPLE DATE	W-Value	Quantile	True/False	W-Value	Quantile	True/False	Count	of Detection
METALS (mg/kg)								
Aluminum	0.932432547	0.829	TRUE	0.897018875	0.829	TRUE	9	9/9
Antimony	0.749994295	0.829	FALSE	0.640859547	0.829	FALSE	9	2/9
Arsenic	0.900481481	0.829	TRUE	0.839398482	0.829	TRUE	9	8/9
Barium	0.973548407	0.829	TRUE	0.942100777	0.829	TRUE	9	9/9
Beryllium	0.922290634	0.829	TRUE	0.684966691	0.829	FALSE	9	7/9
Cadmium	0.897514264	0.829	TRUE	0.905466141	0.829	TRUE	9	0/9
Calcium	0.950664967	0.829	TRUE	0.584211066	0.829	FALSE	9	9/9
Chromium	0.892605857	0.829	TRUE	0.900111261	0.829	TRUE	9	9/9
Cobalt	0.888093974	0.829	TRUE	0.511920257	0.829	FALSE	9	9/9
Copper	0.919879431	0.829	TRUE	0.935552151	0.829	TRUE	9	9/9
Iron	0.896595243	0.829	TRUE	0.877493511	0.829	TRUE	9	9/9
Lead	0.932503796	0.829	TRUE	0.94774216	0.829	TRUE	9	9/9
Magnesium	0.922331255	0.829	TRUE	0.788906861	0.829	FALSE	9	9/9
Manganese	0.663916901	0.829	FALSE	0.444939185	0.829	FALSE	9	9/9
Mercury	0.943468016	0.829	TRUE	0.891444482	0.829	TRUE	9	5/9
Nickel	0.693446619	0.829	FALSE	0.476617772	0.829	FALSE	9	9/9
Potassium	0.875425325	0.829	TRUE	0.917046105	0.829	TRUE	9	9/9
Selenium	0.865283688	0.829	TRUE	0.775801971	0.829	FALSE	9	5/9
Silver	0.828672994	0.829	FALSE	0.740101508	0.829	FALSE	9	4/9
Sodium	0.969730013	0.829	TRUE	0.888851778	0.829	TRUE	9	0/9
Thallium	0.74245522	0.829	FALSE	0.750950301	0.829	FALSE	9	0/9
Vanadium	0.852070862	0.829	TRUE	0.837716388	0.829	TRUE	9	9/9
Zinc	0.903025807	0.829	TRUE	0.599449899	0.829	FALSE	9	8/9

APPENDIX I
GRAPH 1

BASE BACKGROUND SUBSURFACE CLAY

Scatter Plot

Magnesium vs Iron



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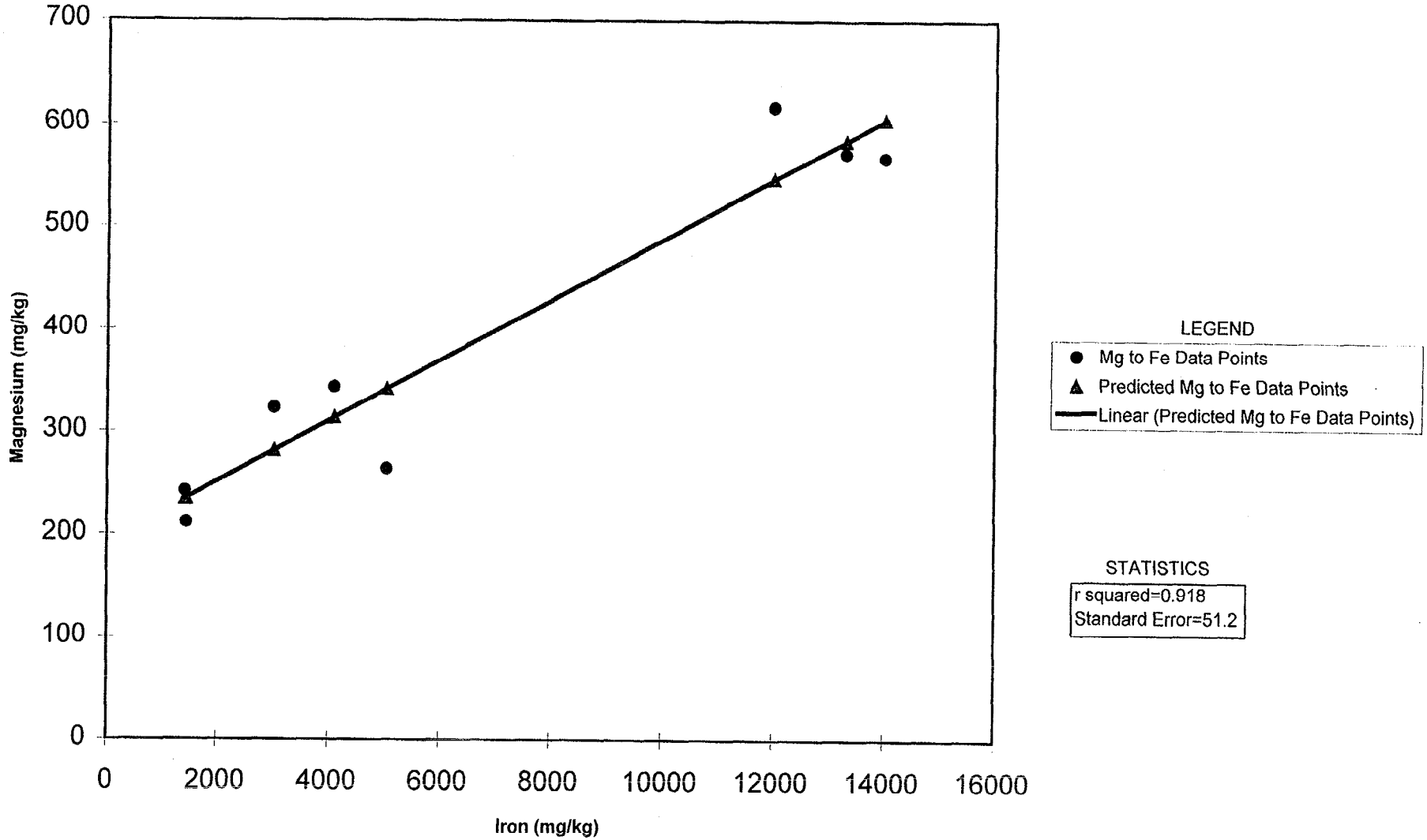
4/5/01

APPENDIX I
GRAPH 2

BASE BACKGROUND SUBSURFACE CLAY

Linear Regression
Magnesium vs Iron



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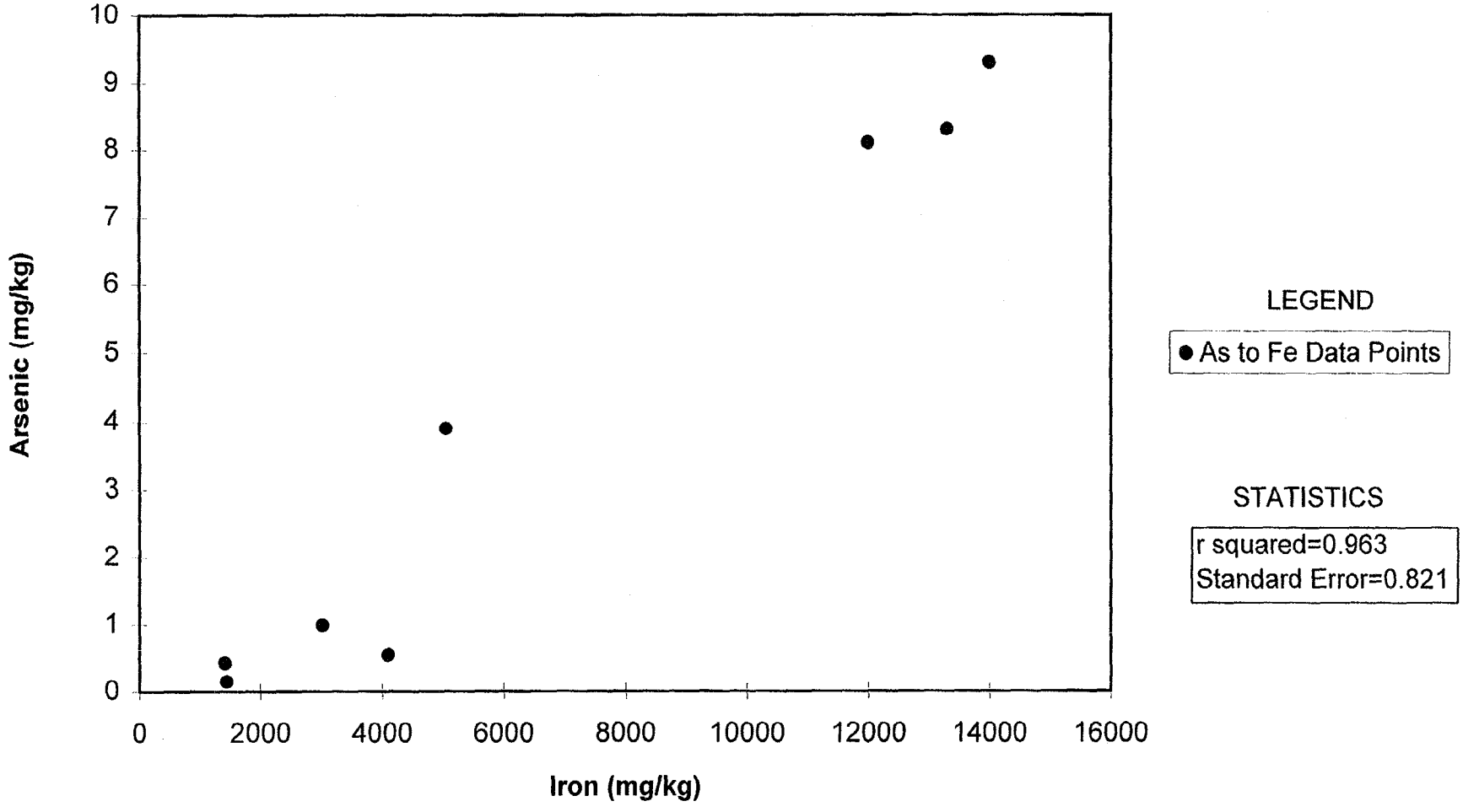
4/5/01

APPENDIX I
GRAPH 3

BASE BACKGROUND SUBSURFACE CLAY

Scatter Plot

Arsenic vs Iron



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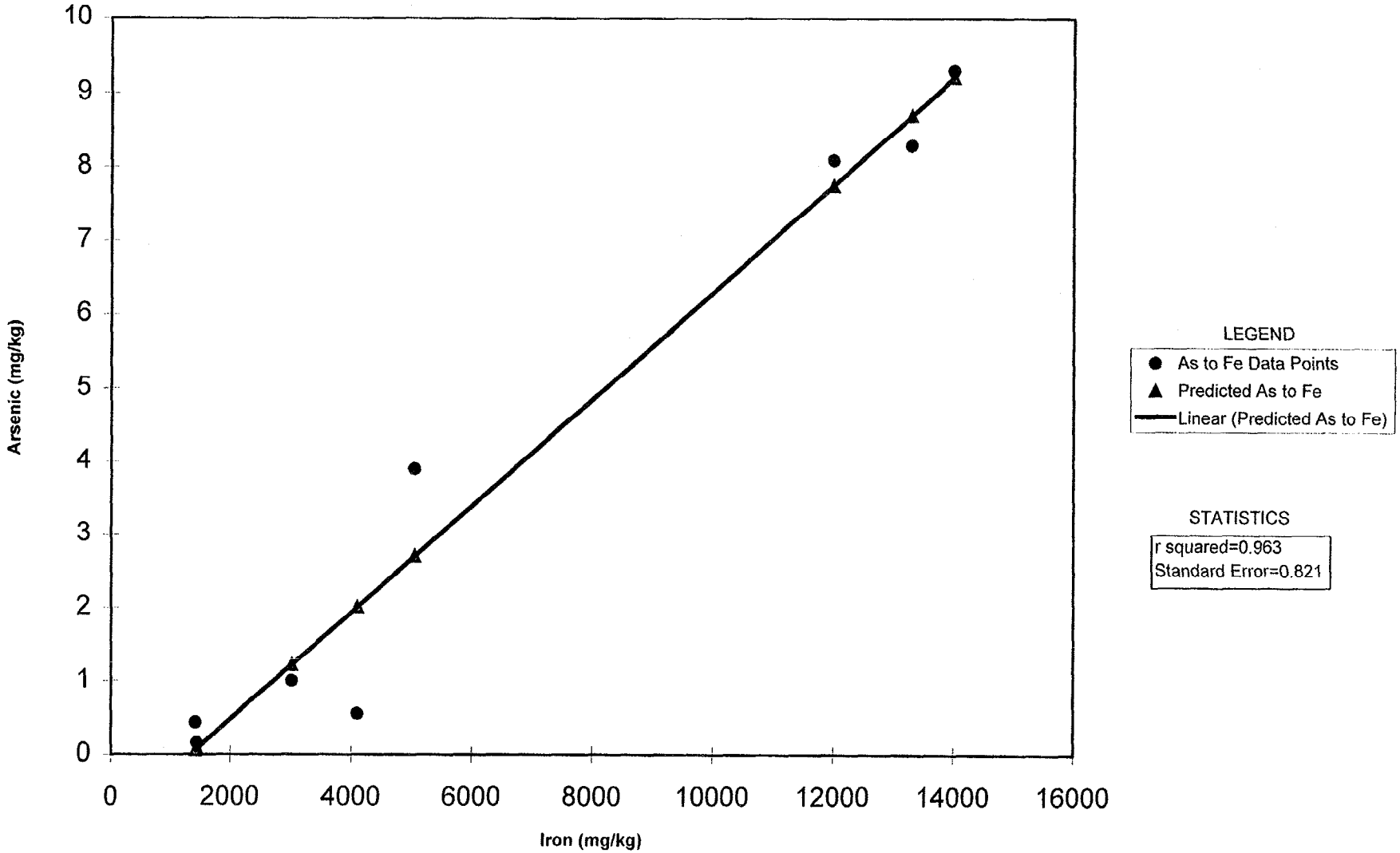
4/5/01

APPENDIX I
GRAPH 4

BASE BACKGROUND SUBSURFACE CLAY

Linear Regression
Arsenic vs Iron



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4/5/01

APPENDIX J
ANALYTICAL RESULTS FOR COMBINED SURFACE SOIL

APPENDIX J.1
BASE BACKGROUND
SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG01-00	BASE-BG02-00	BASE-BG03-00	BASE-BG04-00	BASE-BG05-00	BASE-BG06-00	BASE-BG07-00	BASE-BG08-00
SAMPLE DATE	7/11/00	7/13/00	7/13/00	7/11/00	7/13/00	7/13/00	7/13/00	7/16/00
METALS (mg/kg)								
Aluminum	2040	1380	2090	8530	2320	3140	2170	3680 J
Antimony	0.22 UJ	0.24 UJ	0.27 J	0.32 UJ	0.19 U	0.22 UJ	0.2 U	0.32 J
Arsenic	0.28 U	0.73	0.27 U	0.42 J	0.3 J	0.27 U	0.27 U	0.62 J
Barium	3.9	6	6.3	14	9.5	6.7	7.3	16.7
Beryllium	0.062 U	0.058 U	0.042 J	0.11 U	0.094 J	0.038 U	0.029 J	0.077 J
Cadmium	0.021 U	0.021 U	0.021 U	0.021 U	0.02 U	0.021 U	0.021 U	0.023 U
Calcium	28.4 U	52.7 J	87.6 J	170	17400	152	299	11500
Chromium	2.7	0.85	1.9	9.4	2	3	2.3	4.6
Cobalt	0.086 U	0.19 J	0.083 U	0.4 J	0.12 J	0.14 J	0.083 U	0.44 J
Copper	0.33 J	0.73	0.88	1.3	0.41 U	0.83	0.84 U	2
Iron	251	365	971	5000	1040	623	1300	2410 J
Lead	3.2 J	3.1 J	3 J	7.4 J	4 J	4.6 J	12.1 J	8.2 J
Magnesium	25.9 J	27.9 J	47.4 J	274	333	65.3 J	45.4 J	286
Manganese	0.81 J	17	2.1 J	5.1	9.5 J	2.1	1.3 J	49
Mercury	0.041	0.028 UJ	0.048	0.038	0.044 U	0.053 UJ	0.056 U	0.052
Nickel	0.31 J	0.84	0.64	1.6	0.64	0.91	0.42 J	1.2
Potassium	46.4 J	22.3 J	34.4 J	169 J	45.8 J	73.8 J	35.9 J	139
Selenium	0.24 U	0.23 U	0.23 UJ	0.36 J	0.22 UJ	0.25 J	0.23 UJ	0.43 J
Silver	0.086 U	0.084 U	0.083 U	0.085 U	0.079 U	0.082 U	0.083 U	0.092 U
Sodium	30.8 U	26.2 U	62.8 U	37.7 U	64.7 U	61.1 U	73.1 U	129 U
Thallium	0.35 UJ	0.35 UJ	0.34 UJ	0.35 UJ	0.32 UJ	0.34 UJ	0.34 UJ	0.38 UJ
Vanadium	3.3	1.2 J	2.8	13.4	2.2 U	3.4	4.1	7.6
Zinc	0.9 U	1.5 U	2.5 U	3.8	2.7	2.8 U	3.5	6

APPENDIX J.1
BASE BACKGROUND
SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG09-00	BASE-BG10-00	BASE-BG11-00	BASE-BG12-00	BASE-BG13-00	BASE-BG14-00	BASE-BG15-00	BASE-BG16-00
SAMPLE DATE	7/14/00	7/13/00	7/11/00	7/11/00	7/11/00	7/12/00	7/16/00	7/13/00
METALS (mg/kg)								
Aluminum	190	5390	2540	9130	5390	3770	4730 J	4820
Antimony	0.26 J	0.19 U	0.42 UJ	0.44 UJ	0.49 J	0.23 UJ	0.3 J	0.34 J
Arsenic	0.26 U	0.64 J	0.83 J	0.73 J	0.49 J	0.3 U	0.3 U	1
Barium	1.6	12	14.1	19.6	9.2	12	10	20
Beryllium	0.02 J	0.07 J	0.11 J	0.14 J	0.09 U	0.098 U	0.1 J	0.072 J
Cadmium	0.02 U	0.02 U	0.11 J	0.033 U	0.022 U	0.023 U	0.023 U	0.056 J
Calcium	46.2 U	592	105000	200	75.3 J	344	44.3 J	8720
Chromium	0.51 J	6.4	9.7	9.6	6.1 J	3.3	5	7.4
Cobalt	0.082 U	0.34 J	0.3 J	0.45 J	0.31 J	0.1 J	0.51 J	0.29 J
Copper	2.1	1.5	2.9	2.2	1.6	0.57 J	1.6	5.8
Iron	126	3830	2420	6050	7900	2910	1220 J	3940
Lead	2.8	5.4 J	38.5 J	9.9 J	5.4 J	5.1 J	7.9 J	26.8 J
Magnesium	14 U	146	1610	241	130	114 J	131	330
Manganese	2.3 U	6.4 J	25.9	7.3	3.1	5.3	2.5	13.6 J
Mercury	0.053 U	0.05 U	0.069	0.06	0.018 U	0.032 J	0.061	0.26 U
Nickel	0.092 U	1.4	1.6	1.7	0.83	0.49 J	0.72	1.4
Potassium	13.2 U	88.4 J	263 J	168 J	162	61.7 J	124	102
Selenium	0.22 U	0.22 UJ	0.63 J	0.73 J	0.38 J	0.42 J	0.8	0.22 UJ
Silver	0.082 U	0.08 U	0.083 U	0.13 U	0.097 J	0.093 U	0.092 U	1.1
Sodium	73.7 U	69.1 U	307	46.9 U	39.8 U	38.5 U	102 U	62.2 U
Thallium	0.34 UJ	0.33 UJ	0.34 UJ	0.55 UJ	0.36 UJ	0.38 UJ	0.38 UJ	0.33 UJ
Vanadium	1.2 J	9.8	7.7	16.6	12.4 J	4.8	5.6	9.1
Zinc	1.5 J	3.4	18.4	4.8	4.3	2.8	1 J	25.2

APPENDIX J.1
BASE BACKGROUND
SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG17-00	BASE-BG18-00	BASE-BG19-00	BASE-BG20-00	BASE-BG21-00	BASE-BG22-00	BASE-BG23-00	BASE-BG24-00
SAMPLE DATE	7/13/00	7/14/00	7/14/00	7/16/00	7/15/00	7/14/00	7/11/00	7/13/00
METALS (mg/kg)								
Aluminum	2140	894	5680	2520 J	53.9	4270 J	2660	123
Antimony	0.19 U	0.2 U	0.2 U	0.34 J	0.19 U	0.25 J	0.9 J	0.37 UJ
Arsenic	0.26 U	0.27 U	0.83 J	0.29 U	0.26 U	0.85 J	0.28 U	0.27 U
Barium	6.1	2.4	15.2	9.2	2.3	9.2	9.1	3.6
Beryllium	0.047 J	0.01 U	0.075 J	0.061 J	0.016 J	0.038 J	0.066 U	0.013 U
Cadmium	0.02 U	0.021 U	0.021 U	0.022 U	0.02 U	0.02 U	0.021 U	0.021 U
Calcium	49.4 J	44.2 J	726	48.6 J	43.7 U	171	3840	327
Chromium	1.7	0.98	7.2	3.5	0.29 U	4.4	3.3 J	0.42 J
Cobalt	0.081 U	0.083 U	0.21 J	0.17 J	0.08 U	0.19 J	0.2 J	0.083 U
Copper	1.2	1.1	1.5	0.53 U	0.24 U	1.2	18.2	4.1
Iron	858	751	3280	707 J	44	1890 J	1440	106
Lead	8 J	4 J	11.7	4.3 J	0.45	8.7 J	32.5 J	3 J
Magnesium	48.7 J	18.8 J	193	75.2 J	9.5 U	95.9 J	106	56.2
Manganese	8.7 J	2.6 J	5.4 J	1.6	3.3 J	5.5	18.7	3.1
Mercury	0.037 U	0.033 U	0.1 U	0.032 J	0.045 U	0.04	0.028 J	0.036 UJ
Nickel	0.48 J	0.24 J	0.96	0.11 J	0.09 U	0.9	1.8	0.64 U
Potassium	27.6 J	15 J	135	74.2 J	6.5 U	73 J	54.7 J	36.8 J
Selenium	0.22 UJ	0.23 UJ	0.28 J	0.63	0.22 U	0.22 U	0.23 U	0.34 J
Silver	0.081 U	0.083 U	0.084 U	0.089 U	0.08 U	0.081 U	0.085 U	0.083 U
Sodium	55.7 U	53.3 U	82.3 U	103 U	46.5 U	75.8 U	52.4 U	85.7 U
Thallium	0.34 UJ	0.34 UJ	0.35 UJ	0.37 UJ	0.33 UJ	0.33 UJ	0.35 UJ	0.34 UJ
Vanadium	2.4	1.8 J	11.1	4.7	0.44 J	6.8	3.6 J	0.49 J
Zinc	5.2	3	5.2	0.36 J	0.24 U	1.9 J	25.4	10.8

APPENDIX J.1
BASE BACKGROUND
SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG25-00	BASE-BG26-00	BASE-BG27-00	BASE-BG28-00	BASE-BG29-00	BASE-BG30-00	BASE-BG31-00	BASE-BG32-00
SAMPLE DATE	7/15/00	7/14/00	7/14/00	7/15/00	7/12/00	7/12/00	7/16/00	7/15/00
METALS (mg/kg)								
Aluminum	1460	919	73 J	2870	2070	29.4	6350	1470
Antimony	0.31 J	0.37 J	0.26 J	0.19 U	0.2 UJ	0.22 UJ	0.22 UJ	0.22 U
Arsenic	0.46 J	0.25 U	0.33 U	0.35 J	0.27 U	0.26 U	0.3 U	0.3 U
Barium	5.7	4.3	0.73 J	6.9	5.9	0.28 U	24	2.2
Beryllium	0.082 J	0.026 J	0.013 U	0.05 J	0.038 U	0.018 U	0.08 J	0.033 J
Cadmium	0.02 U	0.019 U	0.026 U	0.056 J	0.021 U	0.02 U	0.023 U	0.023 U
Calcium	112	126	12.4 J	2030	4210	11.8 U	67.8 J	44.7 U
Chromium	1.4	1.3	0.22 U	4.3	2.8	0.17 U	4.1	1.3
Cobalt	0.089 J	0.076 U	0.1 U	0.16 J	0.1 J	0.079 U	0.26 J	0.094 U
Copper	0.97 U	1.3	0.34 U	1.7	1.6	0.9	1.2	0.82 U
Iron	884	456	51.4 J	2200	1660	26.3	2670	1030
Lead	7	3.2	1 J	3.4	3.8 J	0.53 J	5.7	2.3
Magnesium	88.6 J	29 J	7.2 U	107	92 J	6.9 U	115	38.5 J
Manganese	2.3 J	4.1 J	0.53 U	8.5 J	28	0.29 U	5	9.4 J
Mercury	0.063 U	0.048 U	0.021 J	0.071 U	0.027 UJ	0.017 U	0.12 J	0.066 U
Nickel	0.55	0.35 J	0.12 U	0.76	0.73 U	0.088 U	1.4	0.31 J
Potassium	34.2 J	17.6 U	5.8 J	66.3 J	58.9 J	3.8 U	79 J	28.9 J
Selenium	0.32 J	0.21 U	0.28 U	0.37 J	0.23 U	0.22 U	0.25 U	0.26 U
Silver	0.11 J	0.076 U	0.1 U	0.079 U	0.083 U	0.079 U	0.091 U	0.094 U
Sodium	78 U	48.5 U	112 U	49.5 U	50.8 U	28.8 U	78.7 U	94.3 U
Thallium	0.34 UJ	0.32 UJ	0.42 UJ	0.33 UJ	0.34 UJ	0.32 UJ	0.38 UJ	0.39 UJ
Vanadium	3.8	1.5 B	0.36 J	5.2	4.8	0.14 J	6.5	2.3 J
Zinc	5.6	2.7	0.31 U	3.1	5.7	1.1 U	2.8 U	1.8 J

APPENDIX J.1
BASE BACKGROUND
SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG33-00	BASE-BG34-00	BASE-BG35-00	BASE-BG36-00	BASE-BG37-00	BASE-BG38-00	BASE-BG39-00	BASE-BG40-00
SAMPLE DATE	7/14/00	7/15/00	7/16/00	7/15/00	7/16/00	7/16/00	7/16/00	7/16/00
METALS (mg/kg)								
Aluminum	31	1820	2630 J	670	2450 J	54.5	1040	17600 J
Antimony	0.2 U	0.28 J	0.46 J	0.28 J	0.55 J	0.2 UJ	0.23 UJ	0.6 J
Arsenic	0.27 U	0.26 U	0.27 U	0.28 U	0.35 U	0.27 U	0.32 U	1.3 J
Barium	0.48 U	3.5	6	2.2	1.6	0.93 J	4.4	15.7
Beryllium	0.018 J	0.036 J	0.06 J	0.033 J	0.014 U	0.01 U	0.012 U	0.53 J
Cadmium	0.021 U	0.02 U	0.021 U	0.022 U	0.027 U	0.021 U	0.037 J	0.033 U
Calcium	37.2 U	67.5 J	423	77.2 J	30.7 J	143	222	80.5 J
Chromium	0.26 U	1.9	2.2	0.9	2.6	0.24 J	1.4	12.6
Cobalt	0.083 U	0.12 J	0.15 J	0.086 U	0.11 U	0.084 U	0.098 U	0.36 J
Copper	0.28 U	2.2	38.5	1.1	1 U	0.43 J	0.88	1.4
Iron	40.2	836	1520 J	434	538 J	40.1	369	12200 J
Lead	1.2	2.6	4.3 J	3.9	2.4 J	0.99	5.8	8.7 J
Magnesium	10.1 U	53.5 J	159	32.1 J	19.8 J	21.6 J	24.7 J	226
Manganese	5.2 J	14.2 J	16.9	2.8 J	1 U	0.74 J	1.7	6.3
Mercury	0.036 U	0.063 U	0.04	0.08 U	0.029 J	0.051 J	0.086 J	0.11
Nickel	0.093 U	0.53	0.62	0.097 U	0.3 J	0.095 U	0.19 J	1.5
Potassium	10.3 U	29.8 J	47 J	18.8 U	23.7 J	10.2 J	18.7 J	133 J
Selenium	0.23 U	0.22 U	0.46 J	0.24 U	0.31 J	0.23 U	0.27 U	3.4
Silver	0.083 U	0.079 U	0.083 U	0.086 U	0.11 U	0.084 U	0.098 U	0.21 J
Sodium	73.2 U	69.1 U	111 U	67.4 U	127 U	83.6 U	94.8 U	159 U
Thallium	0.34 UJ	0.33 UJ	0.34 UJ	0.36 UJ	0.45 UJ	0.35 UJ	0.4 UJ	0.54 UJ
Vanadium	0.35 J	2.4	2.4	1.5 J	3.7	0.27 J	1.5 J	26.2
Zinc	0.37 U	5.4	3.4	1.3 J	5.3	1.6 U	6.3	2.1 J

APPENDIX J.1
BASE BACKGROUND
SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG41-00	BASE-BG42-00	BASE-BG43-00	BASE-BG44-00	BASE-BG45-00	BASE-BG46-00	BASE-BG47-00	BASE-BG48-00
SAMPLE DATE	7/15/00	7/16/00	7/16/00	7/16/00	7/17/00	7/13/00	7/16/00	7/12/00
METALS (mg/kg)								
Aluminum	1120	2420	79.6	3160	664	478	708	40.8
Antimony	0.48 J	0.33 UJ	0.2 UJ	0.2 UJ	0.2 UJ	0.46 J	0.2 UJ	0.2 UJ
Arsenic	0.37 J	0.29 U	0.28 U	0.58 J	0.27 U	0.27 U	0.27 U	0.27 U
Barium	2.5	4.6	1.1	13.8	2.7	2.1	4.5	0.32 U
Beryllium	0.037 J	0.041 J	0.011 U	0.079 J	0.012 J	0.01 U	0.016 J	0.015 U
Cadmium	0.064 J	0.022 U	0.021 U	0.021 U	0.021 U	0.021 U	0.02 U	0.021 U
Calcium	402	268	25.3 J	56.2 J	72.1 J	58.6 J	176	18 U
Chromium	1.7	2.3	0.41 J	2.7	1.2	0.7	1.3	0.3 U
Cobalt	0.097 U	0.14 J	0.085 U	0.13 J	0.084 U	0.083 U	0.11 J	0.083 U
Copper	1.2	5.4	0.29 J	0.96	0.44 J	4.9	0.89	0.16 U
Iron	724	1090	55.8	1400	346	298	412	34.8
Lead	2.1	3.7	1.5	6.1	1.7	5.5 J	2.4	0.57 J
Magnesium	42.2 J	81.1 J	9.8 J	68.9 J	25.8 J	22.2 J	30.1 J	5.2 U
Manganese	4.5 J	5.8	0.94 J	8.6	2	2 J	8	0.49 U
Mercury	0.05 U	0.059 J	0.047 J	0.096 J	0.06 J	0.038 U	0.058 J	0.017 U
Nickel	0.37 J	0.53 J	0.096 U	0.58	0.094 U	0.15 J	0.44 J	0.093 U
Potassium	21.9 U	33.6 J	13 J	39.7 J	23.6 J	19.4 J	24.7 J	4.7 U
Selenium	0.27 U	0.24 U	0.23 U	0.23 U	0.23 U	0.23 UJ	0.23 U	0.23 U
Silver	0.097 U	0.089 U	0.085 U	0.085 U	0.084 U	0.083 U	0.082 U	0.083 U
Sodium	95.4 U	74.3 U	78.8 U	85.1 U	85.7 U	52.9 U	78.2 U	26.5 U
Thallium	0.4 UJ	0.36 UJ	0.35 UJ	0.35 UJ	0.34 UJ	0.34 UJ	0.34 UJ	0.34 UJ
Vanadium	1.8 J	2 J	0.54 J	3.8	1.6 J	1.2 J	2.7	0.16 J
Zinc	1.5 J	73.9	1.3 U	2.8 U	1.6 U	8.5	2 U	0.67 U

APPENDIX J.1
BASE BACKGROUND
SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG49-00	BASE-BG50-00
SAMPLE DATE	7/12/00	7/12/00
METALS (mg/kg)		
Aluminum	7280	41.6
Antimony	0.2 UJ	0.27 UJ
Arsenic	0.39 J	0.27
Barium	19.5	0.69 U
Beryllium	0.11 J	0.017 U
Cadmium	0.021 U	0.021 U
Calcium	369	18.3 U
Chromium	6.9	0.45 U
Cobalt	0.37 J	0.083 U
Copper	0.98	0.16 U
Iron	2290	94.5
Lead	5.2 J	1.4 J
Magnesium	222	7.7 U
Manganese	3.7	0.64 J
Mercury	0.023 J	0.02 J
Nickel	1.3	0.094 U
Potassium	212 J	5 U
Selenium	0.23 U	0.23 U
Silver	0.085 U	0.083 U
Sodium	25.3 U	31.8 U
Thallium	0.35 UJ	0.34 UJ
Vanadium	10.5	0.54 J
Zinc	3.2	0.66 U

APPENDIX J.2
BASE BACKGROUND
SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID SAMPLE DATE	Minimum Non-Detect		Maximum Non-Detect		Minimum Detected		Maximum Detected		Frequency of Detection	Percent Detected	Percent Non-Detected	Arithmatic Mean Positive Detects	Median Positive Detects	Arithmatic Mean Half Non-Detects
METALS (mg/kg)														
Aluminum	0		0		29.4		17600	J	50/50	100%	0%	2743.6	2115	2743.596
Antimony	0.19	U	0.44	UJ	0.25	J	0.9	J	19/50	38%	62%	0.4	0.34	0.2234
Arsenic	0.25	U	0.35	U	0.27		1.3	J	18/50	36%	64%	0.62	0.6	0.3128
Barium	0.28	U	0.69	U	0.73	J	24		46/50	92%	8%	7.84	6.05	7.2349
Beryllium	0.01	U	0.11	U	0.012	J	0.53	J	31/50	62%	38%	0.07	0.05	0.0517
Cadmium	0.019	U	0.033	U	0.037	J	0.11	J	5/50	10%	90%	0.06	0.06	0.0163
Calcium	11.8	U	46.2	U	12.4	J	105000		42/50	84%	16%	3782.68	161	3179.931
Chromium	0.17	U	0.45	U	0.24	J	12.6		44/50	88%	12%	3.42	2.45	3.0271
Cobalt	0.076	U	0.11	U	0.089	J	0.51	J	27/50	54%	46%	0.24	0.19	0.1468
Copper	0.16	U	1	U	0.29	J	38.5		39/50	78%	22%	3.02	1.3	2.4157
Iron	0		0		26.3		12200	J	50/50	100%	0%	1622.64	871	1622.642
Lead	0		0		0.45		38.5	J	50/50	100%	0%	6.14	4	6.1408
Magnesium	5.2	U	14	U	9.8	J	1610		43/50	86%	14%	137.43	75.2	118.798
Manganese	0.29	U	2.3	U	0.64	J	49		45/50	90%	10%	7.58	5.1	6.8707
Mercury	0.017	U	0.26	U	0.02	J	0.12	J	25/50	50%	50%	0.05	0.05	0.0403
Nickel	0.088	U	0.73	U	0.11	J	1.8		37/50	74%	26%	0.79	0.64	0.6056
Potassium	3.8	U	21.9	U	5.8	J	263	J	41/50	82%	18%	69.6	46.4	58.088
Selenium	0.21	U	0.28	U	0.25	J	3.4		16/50	32%	68%	0.63	0.4	0.2814
Silver	0.076	U	0.13	U	0.097	J	1.1		4/50	8%	92%	0.38	0.16	0.0702
Sodium	25.3	U	159	U	307		307		1/50	2%	98%	307	307	40.46
Thallium	0.32	UJ	0.55	UJ	0		0		0/50	0%	100%	--	--	0.1799
Vanadium	1.5	B	2.2	U	0.14	J	26.2		48/50	96%	4%	4.6	3.05	4.4488
Zinc	0.24	U	2.8	U	0.36	J	73.9		34/50	68%	32%	7.62	3.65	5.4127

APPENDIX J.2
BASE BACKGROUND
SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID SAMPLE DATE	Standard Deviation	Upper 95% Confidence Level	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Degree of Freedom	H Statistic	Log Upper 95% Confidence Level	Location of Maximum Detect	Location of Maximum Detect
METALS (mg/kg)									
Aluminum	3110.8647	3481.1825	7.08	1.69	49	3.241	10707.0371	BASE-BG40-00	
Antimony	0.1702	0.2638	-1.72	0.64	49	2.038	0.2651	BASE-BG23-00	
Arsenic	0.2831	0.3799	-1.46	0.73	49	2.127	0.3763	BASE-BG40-00	
Barium	6.0747	8.6752	1.47	1.24	49	2.607	14.919	BASE-BG31-00	
Beryllium	0.0765	0.0698	-3.5	1.06	49	2.607	0.078	BASE-BG40-00	
Cadmium	0.0181	0.0206	-4.35	0.54	49	1.957	0.0174	BASE-BG11-00	
Calcium	15029.9662	6743.5381	5.03	2.07	49	4.29	4609.6595	BASE-BG11-00	
Chromium	2.9528	3.7272	0.51	1.28	49	2.915	6.5146	BASE-BG40-00	
Cobalt	0.1324	0.1782	-2.3	0.88	49	2.224	0.1948	BASE-BG15-00	
Copper	5.8703	3.8075	-0.02	1.22	49	2.607	3.2525	BASE-BG35-00	
Iron	2237.2638	2153.0976	6.52	1.54	49	3.241	4532.498	BASE-BG40-00	
Lead	7.4046	7.8964	1.37	0.94	49	2.327	8.3978	BASE-BG11-00	
Magnesium	232.9286	174.0254	3.91	1.39	49	2.915	235.7522	BASE-BG11-00	
Manganese	8.7356	8.9419	1.28	1.25	49	2.607	12.4844	BASE-BG08-00	
Mercury	0.0279	0.0469	-3.42	0.65	49	2.038	0.0489	BASE-BG31-00	
Nickel	0.5229	0.7296	-1.05	1.24	49	2.607	1.1892	BASE-BG23-00	
Potassium	59.7542	72.2557	3.47	1.24	49	2.607	109.2296	BASE-BG11-00	
Selenium	0.4838	0.3961	-1.7	0.75	49	2.127	0.3056	BASE-BG40-00	
Silver	0.151	0.106	-3.01	0.54	49	1.957	0.0659	BASE-BG16-00	
Sodium	41.0675	50.1971	3.51	0.54	49	1.957	45.1389	BASE-BG11-00	
Thallium	0.023	0.1854	-1.72	0.11	49	1.722	0.1848		
Vanadium	4.9645	5.6259	0.89	1.23	49	2.607	8.1581	BASE-BG40-00	
Zinc	11.2736	8.0857	0.78	1.33	49	2.915	9.2173	BASE-BG42-00	

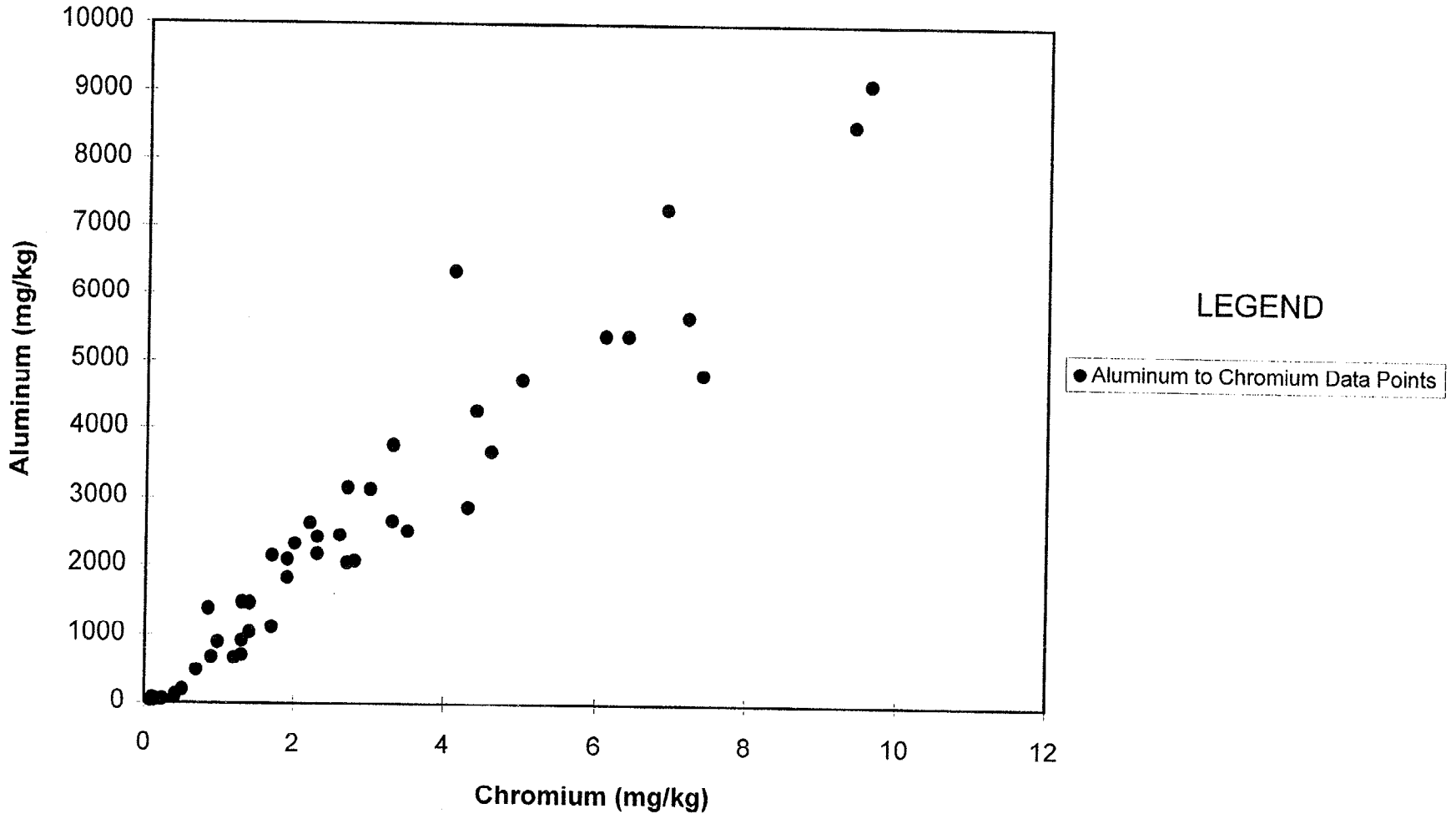
APPENDIX J.2
BASE BACKGROUND
SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	Lognormal Distribution			Normal Distribution			Sample
SAMPLE DATE	W-Value	Quantile	True/False	W-Value	Quantile	True/False	Count
METALS (mg/kg)							
Aluminum	0.86712061	0.947	FALSE	0.765093227	0.947	FALSE	50
Antimony	0.841064099	0.947	FALSE	0.765392064	0.947	FALSE	50
Arsenic	0.749309429	0.947	FALSE	0.699446907	0.947	FALSE	50
Barium	0.90196823	0.947	FALSE	0.89411854	0.947	FALSE	50
Beryllium	0.948984367	0.947	TRUE	0.509609584	0.947	FALSE	50
Cadmium	0.498041894	0.947	FALSE	0.400111787	0.947	FALSE	50
Calcium	0.918735851	0.947	FALSE	0.22926366	0.947	FALSE	50
Chromium	0.930579654	0.947	FALSE	0.842062495	0.947	FALSE	50
Cobalt	0.842814356	0.947	FALSE	0.791508452	0.947	FALSE	50
Copper	0.96344399	0.947	TRUE	0.366753751	0.947	FALSE	50
Iron	0.943061193	0.947	FALSE	0.683785179	0.947	FALSE	50
Lead	0.969792821	0.947	TRUE	0.616051125	0.947	FALSE	50
Magnesium	0.965695836	0.947	TRUE	0.440775444	0.947	FALSE	50
Manganese	0.978117649	0.947	TRUE	0.69033126	0.947	FALSE	50
Mercury	0.976029896	0.947	TRUE	0.834654234	0.947	FALSE	50
Nickel	0.863886396	0.947	FALSE	0.873966858	0.947	FALSE	50
Potassium	0.956285628	0.947	TRUE	0.818705828	0.947	FALSE	50
Selenium	0.711588179	0.947	FALSE	0.38012844	0.947	FALSE	50
Silver	0.414343488	0.947	FALSE	0.210047761	0.947	FALSE	50
Sodium	0.919574039	0.947	FALSE	0.445239336	0.947	FALSE	50
Thallium	0.710058727	0.947	FALSE	0.647359048	0.947	FALSE	50
Vanadium	0.967917168	0.947	TRUE	0.770795328	0.947	FALSE	50
Zinc	0.982372427	0.947	TRUE	0.442211818	0.947	FALSE	50

APPENDIX J
GRAPH 1

BASE BACKGROUND - COMBINED SURFACE SOILS

Scatter Plot
Aluminum vs. Chromium



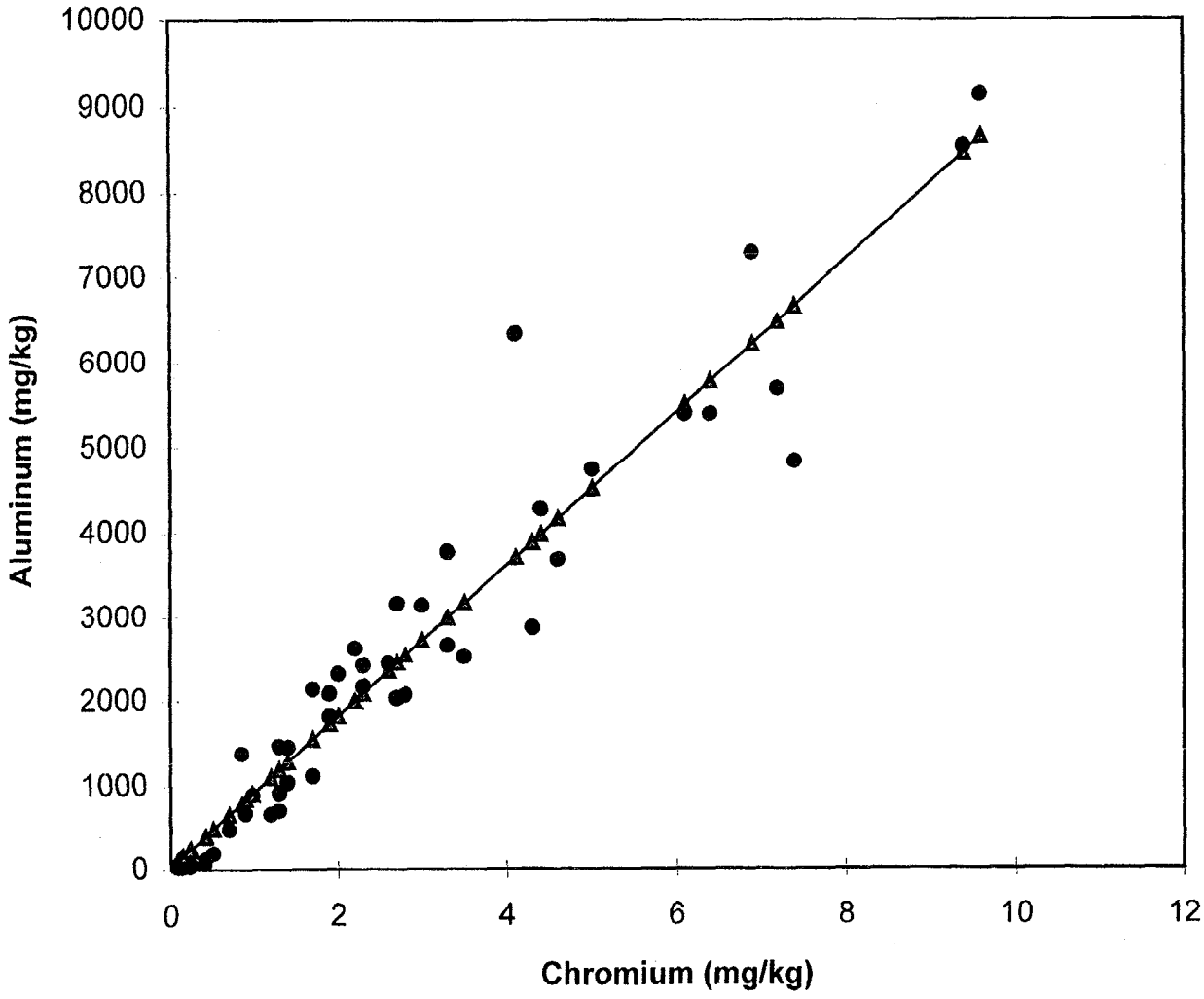
K:\62470\371phase\data\datatable\lejeunebackground\tables\basetables\newstats\regression\Base totalSSRGAl to Cr Chart 1

4/9/01

APPENDIX J
GRAPH 2

BASE BACKGROUND - COMBINED SURFACE SOILS

Regression Plot
Aluminum vs. Chromium



LEGEND

- Aluminum to Chromium Data Points
- Predicted Aluminum to Chromium
- Linear (Predicted Aluminum to Chromium)

STATISTICS

r squared = .923
standard error = 644

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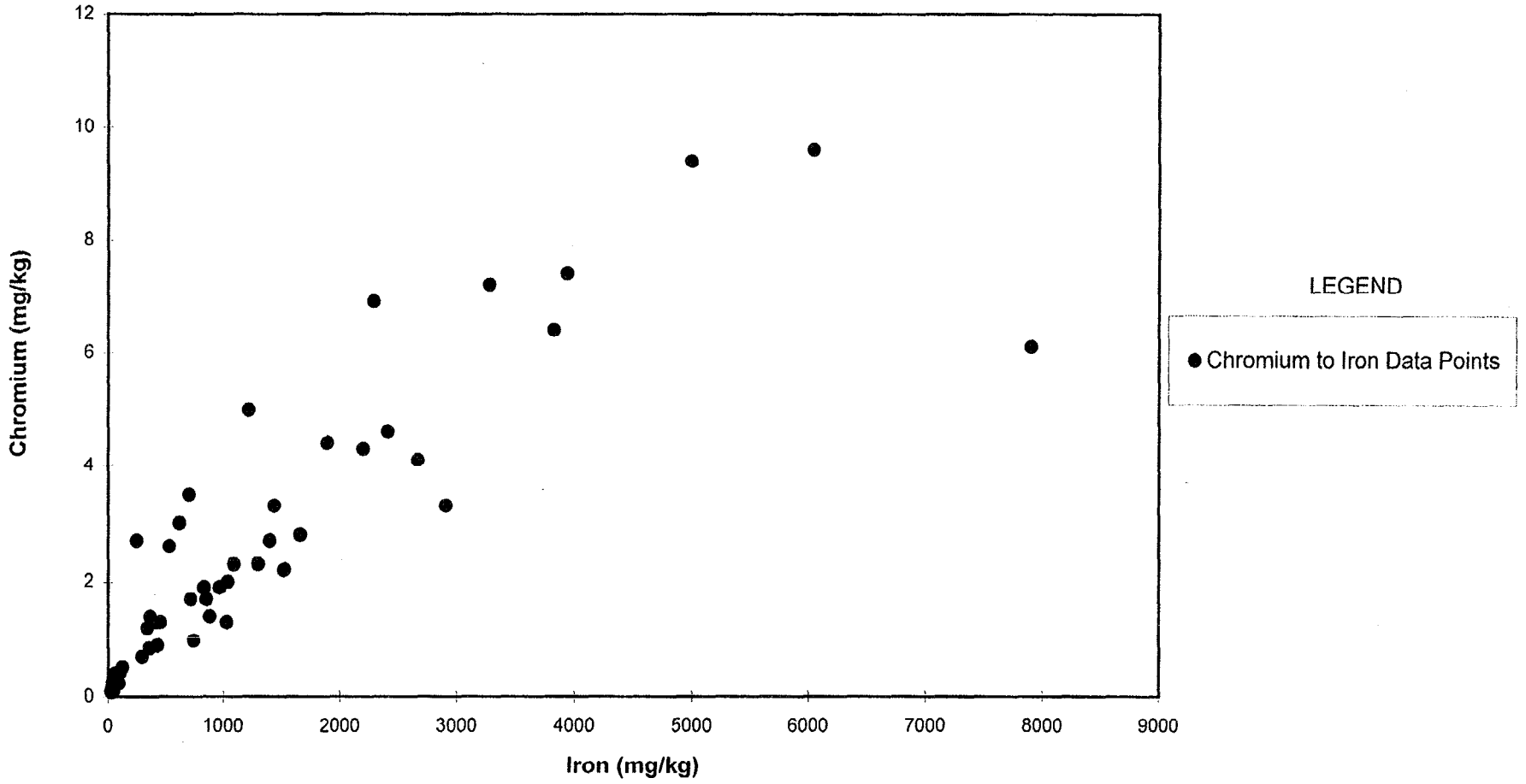
APPENDIX J
GRAPH 3

BASE BACKGROUND - COMBINED SURFACE SOILS

Scatter Plot
Chromium vs. Iron



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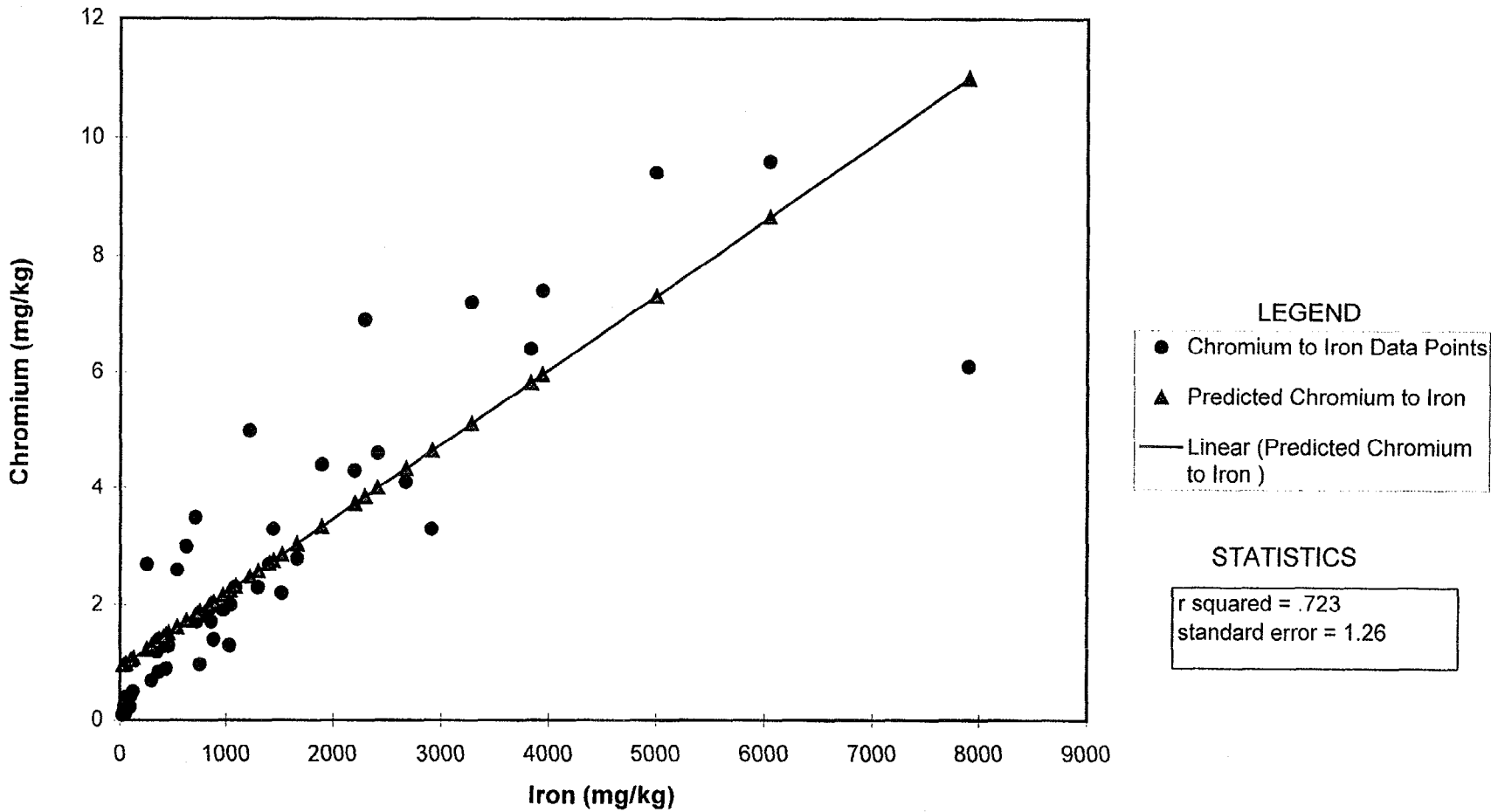
APPENDIX J
GRAPH 4

BASE BACKGROUND - COMBINED SURFACE SOILS

Regression Plot

Chromium vs. Iron



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APPENDIX K
ANALYTICAL RESULTS FOR COMBINED SUBSURFACE SOIL

APPENDIX K.1
BASE BACKGROUND
SUB-SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG01-02	BASE-BG02-03	BASE-BG03-02	BASE-BG04-02	BASE-BG05-02	BASE-BG06-05	BASE-BG07-03	BASE-BG08-05	BASE-BG09-05
SAMPLE DATE	7/11/00	7/13/00	7/13/00	7/11/00	7/13/00	7/13/00	7/13/00	7/16/00	7/14/00
METALS (mg/kg)									
Aluminum	2830	6000	10700	4660	10900	3330	6860	1570 J	7640
Antimony	0.25 UJ	0.29 UJ	0.24 U	0.43 UJ	0.24 U	0.2 UJ	0.28 J	0.41 J	0.22 U
Arsenic	0.29 U	1 J	8.3	0.3 U	9.3	1.1	0.3 U	0.3 U	0.3 U
Barium	5.2	12.7	21.4	10.5	13.4	18.2	11.1	3.4	7.9
Beryllium	0.057 U	0.092 U	0.19 J	0.069 U	0.16 J	0.069 U	0.13 J	0.012 U	0.097 J
Cadmium	0.022 U	0.024 U	0.025 U	0.023 U	0.025 U	0.021 U	0.023 U	0.023 U	0.023 U
Calcium	16.1 U	235	172	104 J	1800	61.3 J	42.9 J	22.8 J	39.4 U
Chromium	2.8	13.2	20.8	5.6	19.3	5.2	9.3	3.2	7.5
Cobalt	0.088 U	0.14 J	0.47 J	0.22 J	0.46 J	0.1 J	1.1	0.092 U	0.35 J
Copper	0.16 U	1.8	3.6	0.44 J	3.9	1.4	1.8	0.48 U	0.72 U
Iron	322	3020	13300	1290	14000	2410	1450	1130 J	1330
Lead	3.1 J	8.6 J	10.7 J	5.2 J	10.7 J	3 J	6.6 J	2.5 J	5.1
Magnesium	62.3 J	323	572	151	568	78.1 J	212	63.3 J	214
Manganese	1.1	3.5	5.1 J	3	5.9 J	1.4	3.4 J	2	3.7 J
Mercury	0.041	0.032 UJ	0.09	0.03 J	0.045	0.028 UJ	0.036 U	0.029 J	0.055 U
Nickel	0.33 J	0.86	1.1	0.76	1.1	0.53 U	1.4	0.1 U	1.2
Potassium	45.7 J	303 J	565	131 J	518	66 J	275	57.9 J	292
Selenium	0.25 J	0.26 U	0.51 J	0.26 U	0.59 J	0.27 J	0.25 UJ	0.4 J	0.25 U
Silver	0.088 U	0.096 U	0.15 J	0.094 U	0.19 J	0.082 U	0.092 U	0.092 U	0.091 U
Sodium	29.2 U	68 U	86.2 U	38.4 U	63.8 U	49.6 U	98.3 U	102 U	51.2 U
Thallium	0.36 UJ	0.4 UJ	0.42 UJ	0.39 UJ	0.42 UJ	0.34 UJ	0.38 UJ	0.38 UJ	0.38 UJ
Vanadium	3	9.3	31.9	5.1	32	7.4	9.7	7.7	6.3
Zinc	2.1 U	4.2	6.4	2.9 U	6.5	2.4 U	4.3	0.28 U	4.2

APPENDIX K.1
BASE BACKGROUND
SUB-SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG10-03	BASE-BG11-03	BASE-BG12-04	BASE-BG13-03	BASE-BG14-01	BASE-BG15-03	BASE-BG16-04	BASE-BG17-04	BASE-BG18-02
SAMPLE DATE	7/13/00	7/11/00	7/11/00	7/11/00	7/12/00	7/16/00	7/13/00	7/13/00	7/14/00
METALS (mg/kg)									
Aluminum	1410	8800	1740	14900	4500	15600 J	1200	6850	260 J
Antimony	0.35 J	0.28 UJ	0.21 UJ	0.23 UJ	0.34 UJ	0.5 J	0.23 U	0.2 UJ	0.2 UJ
Arsenic	0.27 U	3.9	0.29 U	0.55 J	0.29 U	8.1	0.32 U	0.43 J	0.28 U
Barium	2	15.7	3.9	14.6	15.6	22.4	3.2	8.2	1.2
Beryllium	0.028 J	0.24 J	0.035 U	0.26 J	0.1 U	0.26 J	0.024 J	0.098 U	0.011 U
Cadmium	0.021 U	0.025 U	0.022 U	0.024 U	0.022 U	0.026 U	0.024 U	0.022 U	0.022 U
Calcium	63.2 J	148	29.7 U	112 J	4950	30.4 J	73.6 J	181	12.7 J
Chromium	1.6	22.6	1.8	15.9 J	4.6	23.3	1.6	9.3	0.83
Cobalt	0.083 U	0.32 J	0.11 J	0.67	0.23 J	0.71	0.098 U	0.32 J	0.087 U
Copper	0.3 U	4.2	0.24 J	3.2	1.2	3.5	0.31 U	0.85	0.43 U
Iron	356	5050	329	4100	2720	12000 J	481	1420	121 J
Lead	1.9 J	10 J	1.9 J	7.5 J	8.7 J	12.2 J	1.8 J	4.8 J	1.3 J
Magnesium	46.9 J	264	44.7 J	343	190	617	38.5 J	242	16.8 J
Manganese	1.3 J	4.5	2	5.2	17.2	6.7	1.6 J	3	1.9
Mercury	0.027 U	0.044 J	0.022 J	0.02 U	0.027 J	0.036 J	0.027 U	0.032 UJ	0.019 U
Nickel	0.2 J	1.2	0.37 J	1.6	1	2	0.34 J	0.93	0.097 U
Potassium	32 J	869 J	53.6 J	644	102 J	784	31.8 J	269 J	17.6 J
Selenium	0.23 UJ	0.49 J	0.24 U	0.26 U	0.3 J	1.3	0.27 UJ	0.24 U	0.24 U
Silver	0.083 U	0.1 U	0.088 U	0.096 U	0.088 U	0.36 J	0.098 U	0.086 U	0.087 U
Sodium	64.6 U	41 U	34.7 U	47.1 U	45.6 U	140 U	71.3 U	56.6 U	80.2 U
Thallium	0.34 UJ	0.42 UJ	0.36 UJ	0.4 UJ	0.36 UJ	0.42 UJ	0.4 UJ	0.35 UJ	0.36 UJ
Vanadium	1.7 J	24.2	1.9 J	13.6 J	7.2	39	2.3 J	8.8	0.75 J
Zinc	1.2 U	4.8	1.6 U	11.8	6.9	6.4	1.3 U	3.1 U	0.26 U

APPENDIX K.1
BASE BACKGROUND
SUB-SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG19-04	BASE-BG20-01	BASE-BG21-02	BASE-BG22-04	BASE-BG23-01	BASE-BG24-01	BASE-BG25-01	BASE-BG26-03	BASE-BG27--
SAMPLE DATE	7/14/00	7/16/00	7/15/00	7/14/00	7/11/00	7/13/00	7/14/00	7/14/00	7/14/00
METALS (mg/kg)									
Aluminum	4620	4070 J	8640	5810 J	9900	5260	1340	3630	4640 J
Antimony	0.21 U	0.23 UJ	0.22 U	0.31 J	0.31 J	0.22 U	0.2 J	0.32 J	0.4 J
Arsenic	0.88 J	0.31 U	0.3 U	0.28 U	0.92 J	0.31 U	0.27 U	0.28 U	0.34 J
Barium	5.3	10.4	7.1	7.4	13.9	3.2	4	6.8	15.3
Beryllium	0.058 J	0.062 J	0.081 J	0.07 J	0.095 U	0.023 J	0.028 J	0.049 J	0.07 J
Cadmium	0.022 U	0.024 U	0.023 U	0.022 U	0.022 U	0.024 U	0.021 U	0.022 U	0.021 U
Calcium	26.8 U	87.2 J	38.5 U	41.6 J	499	13 U	83.8 J	44.2 U	71.3 J
Chromium	5.3	7.8	9.4	7.4	9.6 J	5.2	1.5	4.2	4.5
Cobalt	0.14 J	0.21 J	0.74	0.22 J	0.84	0.25 J	0.084 U	0.2 J	0.6
Copper	0.7 U	0.95	0.66 U	0.94 U	3.1	0.43 U	0.25 J	2.8	1.7
Iron	1580	840 J	1770	877 J	4600	1370	953	1530	3440 J
Lead	3.3	5.1 J	6	4.1 J	4 J	2.6 J	1.9	2.8	3.5 J
Magnesium	130	144	193	166	197	55.2 J	65.5 J	101 J	216
Manganese	2 J	4.7	5.9	2.8	4.5	1 J	2.2	2.4 J	7.1
Mercury	0.047 U	0.031 J	0.061	0.018 U	0.024 J	0.051 U	0.025 J	0.054 U	0.022 J
Nickel	0.55 J	0.39 J	1.9	0.37 J	3.6	2	0.44 J	0.95	1.6
Potassium	130	176	190	235	189	33.6 J	33.4 J	64.2 J	121
Selenium	0.26 J	0.44 J	0.25 U	0.24 J	0.24 U	0.26 UJ	0.23 U	0.24 U	0.32 J
Silver	0.089 U	0.095 U	0.092 U	0.086 U	0.087 U	0.094 U	0.084 U	0.087 U	0.085 U
Sodium	44.6 U	116 U	83.9 U	87.2 U	40.7 U	62.8 U	89.6 U	55 U	65.2 U
Thallium	0.37 UJ	0.39 UJ	0.38 UJ	0.36 UJ	0.36 UJ	0.39 UJ	0.34 UJ	0.36 UJ	0.35 UJ
Vanadium	7.6	13.7	7.1	8.6	11.7 J	9.9	2.4	5.4	8.9
Zinc	1.5 J	0.33 J	3.4	0.84 J	5.1	1.3 U	1.3 U	2.5	1.8 J

APPENDIX K.1
BASE BACKGROUND
SUB-SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG28-02	BASE-BG29-02	BASE-BG30-01	BASE-BG31-04	BASE-BG32-03	BASE-BG33-02	BASE-BG34-03	BASE-BG35-01	BASE-BG36-01
SAMPLE DATE	7/15/00	7/12/00	7/12/00	7/16/00	7/15/00	7/14/00	7/15/00	7/16/00	7/15/00
METALS (mg/kg)									
Aluminum	16800	8160	3800	407	2540	1100 J	2200	1210 J	9670
Antimony	0.47 J	0.23 UJ	0.22 UJ	0.21 UJ	0.24 U	0.26 J	0.28 J	0.23 J	0.2 U
Arsenic	1.9	0.42 J	0.28 U	0.28 U	0.32 U	0.32 U	0.27 U	0.28 U	1.4
Barium	23.1	16.6	1.8	1.4	0.92 J	1.6	4	3.2	12.7
Beryllium	0.15 J	0.12 U	0.047 U	0.011 U	0.16 J	0.012 U	0.038 J	0.015 J	0.068 J
Cadmium	0.023 U	0.024 U	0.022 U	0.022 U	0.025 U	0.025 U	0.021 U	0.021 U	0.021 U
Calcium	557	98.7 J	14.5 U	21.3 J	35.6 U	9.1 U	44.2 U	112	66.7 J
Chromium	22.5	9.7	6.1	1	2.5	1.3	2.5	1.4	13.2
Cobalt	0.68	0.43 J	0.087 U	0.087 U	0.14 J	0.16 J	0.24 J	0.085 U	1
Copper	3	1.9	0.58	0.47 J	1.6	0.72 U	0.53 U	0.67	1 U
Iron	15600	4120	93.1	222	102	485 J	624	715 J	4310
Lead	8.1	6.2 J	3.6 J	1.6	1	1.1 J	1.4	1.7 J	5.2
Magnesium	525	266	16.9 J	22.6 J	12.3 U	39 J	86.3 J	54.8 J	209
Manganese	6.9 J	3.9	0.75 J	1 J	3.5 J	2.3	3.9 J	2.7	4.2 J
Mercury	0.057 U	0.026 UJ	0.039	0.042 J	0.067 U	0.021 J	0.053 U	0.025 J	0.081 U
Nickel	2.8	1.4	0.26 J	0.098 U	0.11 U	0.64	0.66	0.096 U	3
Potassium	434	264 J	28.5 J	22.6 J	17.2 U	22.4 J	51.1 J	37.2 J	124
Selenium	0.77	0.42 J	0.31 J	0.24 U	0.27 J	0.29 J	0.23 U	0.24 U	0.46 J
Silver	0.24 J	0.097 U	0.087 U	0.087 U	0.099 U	0.1 U	0.082 U	0.085 U	0.1 J
Sodium	59.4 U	53.3 U	28.7 U	72.3 U	59.5 U	84.3 U	64.7 U	101 U	57.5 U
Thallium	0.38 UJ	0.4 UJ	0.36 UJ	0.36 U	0.41 UJ	0.41 UJ	0.34 UJ	0.35 UJ	0.35 UJ
Vanadium	33.9	14	3	1.1 J	0.35 J	1.4 J	2.3	1.4 J	11.9
Zinc	7.4	6.1	0.84 U	1.3 U	0.31 U	0.3 U	1.1 J	0.26 U	2.3

APPENDIX K.1
BASE BACKGROUND
SUB-SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG37--	BASE-BG38-01	BASE-BG39-01	BASE-BG40-01	BASE-BG41-01	BASE-BG42-01	BASE-BG43-03	BASE-BG44-03	BASE-BG45-01
SAMPLE DATE	7/16/00	7/16/00	7/16/00	7/16/00	7/15/00	7/16/00	7/16/00	7/16/00	7/17/00
METALS (mg/kg)									
Aluminum	3720 J	372	2470 J	4780	3310	3500	1620	6450	4890
Antimony	0.22 UJ	0.23 UJ	0.27 J	0.23 UJ	0.24 U	0.22 UJ	0.2 UJ	0.26 UJ	0.22 UJ
Arsenic	0.3 U	0.32 U	0.31 U	0.32 U	0.43 J	0.37 J	0.27 U	0.3 U	3.2
Barium	4.2	0.67 J	4	5.7	3.1	5.9	1.8	8	5.7
Beryllium	0.012 U	0.012 U	0.013 J	0.036 J	0.046 J	0.054 J	0.01 U	0.04 J	0.042 J
Cadmium	0.023 U	0.025 U	0.024 U	0.025 U	0.025 U	0.023 U	0.021 U	0.023 U	0.023 U
Calcium	29.2 J	41.6 J	28 J	37.3 J	82.6 J	159	28.3 J	42.7 J	42 J
Chromium	4.4	1.2	2.7	4.4	4.8	2.2	1.7	7.1	9
Cobalt	0.23 J	0.098 U	0.14 J	0.41 J	0.099 U	0.092 U	0.11 J	0.26 J	0.13 J
Copper	0.43 U	0.23 J	0.44 U	0.59 J	0.48 U	3.3	1.2	0.75	0.72
Iron	1380 J	81.5	626 J	1440	776	1120	611	1720	2490
Lead	2.6 J	1.6	2.2 J	2.6	3.3 J	3.5	1.5	3.2	4.2
Magnesium	106 J	13.5 J	87.1 J	123 J	24.4 J	87 J	30.1 J	167	168
Manganese	2	1.1 J	1.8	1.9	0.74 J	4.2	1.3	2.6	2.6
Mercury	0.026 J	0.06 J	0.021 J	0.085 J	0.072 U	0.061 J	0.055 J	0.054 J	0.16 J
Nickel	0.94	0.11 U	0.12 J	1.2	0.42 J	0.52 J	0.71	0.8	0.5 J
Potassium	66.9 J	16 J	44.8 J	63.5 J	17.4 J	31 J	22.4 J	121 J	120 J
Selenium	0.47 J	0.27 U	0.26 U	0.27 U	0.27 UJ	0.25 U	0.23 U	0.25 U	0.26 U
Silver	0.093 U	0.098 U	0.094 U	0.098 U	0.099 U	0.092 U	0.083 U	0.092 U	0.093 U
Sodium	97 U	92 U	80.1 U	87.3 U	59.9 U	90.3 U	80.8 U	98.7 U	101 U
Thallium	0.38 UJ	0.41 UJ	0.39 UJ	0.4 UJ	0.41 UJ	0.38 UJ	0.34 UJ	0.38 UJ	0.38 UJ
Vanadium	4.6	0.6 J	2.6	5.7	2 J	2 J	1.7 J	7.1	6.6
Zinc	0.28 U	2 U	0.28 U	2.6 U	1 U	7.9	2.1 U	4.2	3.3

APPENDIX K.1
BASE BACKGROUND
SUB-SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID	BASE-BG46-02	BASE-BG47-04	BASE-BG48-01	BASE-BG49-02	BASE-BG50-01
SAMPLE DATE	7/13/00	7/16/00	7/12/00	7/12/00	7/12/00
METALS (mg/kg)					
Aluminum	1450	5290	3640	9510	4680
Antimony	0.23 U	0.24 UJ	0.4 UJ	0.23 UJ	0.35 UJ
Arsenic	0.32 U	3.3	0.28 U	2.6	0.3 U
Barium	1.4	27.1	1.8	12.1	3.3
Beryllium	0.039 J	0.91	0.041 U	0.22 J	0.035 U
Cadmium	0.025 U	0.025 U	0.022 U	0.024 U	0.023 U
Calcium	12.6 U	458	21.3 U	256	16.9 U
Chromium	1.9	11.3	6.1	15.9	6.1
Cobalt	0.098 U	6.8	0.086 U	0.39 J	0.41 J
Copper	0.27 U	6.7	0.52 J	2.2	0.17 U
Iron	1250	8450	251	6550	1160
Lead	1.8 J	5.4	3.4 J	5.3 J	2.8 J
Magnesium	14.9 J	1250	28.7 J	367	58.6 J
Manganese	0.57 J	67.6	1.1	5.7	3.7
Mercury	0.042 U	0.059 J	0.044	0.034 J	0.042
Nickel	0.13 J	12.3	0.51 J	0.97	2
Potassium	11.9 J	668 J	34.3 J	546 J	46.4 J
Selenium	0.27 UJ	0.3 J	0.32 J	0.27 U	0.25 U
Silver	0.098 U	0.1 J	0.086 U	0.12 J	0.092 U
Sodium	62 U	66.4 U	37.1 U	37 U	33.5 U
Thallium	0.41 UJ	0.42 UJ	0.36 UJ	0.4 UJ	0.38 UJ
Vanadium	3.2	11.1	3	17.1	6.4
Zinc	1 U	39.7	1.5 U	5	1.9 U

APPENDIX K.2
BASE BACKGROUND
SUB-SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

SAMPLE ID SAMPLE DATE	Minimum Non-Detect		Maximum Non-Detect		Minimum Detected		Maximum Detected		Frequency of Detection	Percentage of Detection	Percentage of Non-Detects	Arithmatic Mean Positive Detects	Median Positive Detects	Arithmatic Mean Half Non-Detects	Standard Deviation	Upper 95% Confidence Level
METALS (mg/kg)																
Aluminum	0		0		260	J	16800		50/50	100%	0%	5184.58	4560	5184.58	3937.9634	6118.2717
Antimony	0.2	UJ	0.43	UJ	0.2	J	0.5	J	14/50	28%	72%	0.33	0.31	0.1799	0.1062	0.2051
Arsenic	0.27	U	0.32	U	0.34	J	9.3		19/50	38%	62%	2.55	1.1	1.0604	2.1143	1.5617
Barium	0		0		0.67	J	27.1		50/50	100%	0%	8.28	5.8	8.2818	6.6886	9.8677
Beryllium	0.01	U	0.12	U	0.013	J	0.91		31/50	62%	38%	0.12	0.06	0.0826	0.1377	0.1152
Cadmium	0.021	U	0.026	U	0		0		0/50	0%	100%	--	--	0.0115	0.0007	0.0117
Calcium	9.1	U	44.2	U	12.7	J	4950		36/50	72%	28%	301.45	78.1	220.663	734.2166	394.7459
Chromium	0		0		0.83		23.3		50/50	100%	0%	7.25	5.25	7.2466	6.2017	8.717
Cobalt	0.083	U	0.099	U	0.1	J	6.8		36/50	72%	28%	0.55	0.29	0.4112	0.9595	0.6387
Copper	0.16	U	1	U	0.23	J	6.7		32/50	64%	36%	1.86	1.5	1.2789	1.4291	1.6177
Iron	0		0		81.5		15600		50/50	100%	0%	2719.31	1350	2719.312	3724.1334	3602.3045
Lead	0		0		1		12.2	J	50/50	100%	0%	4.24	3.35	4.244	2.7984	4.9075
Magnesium	12.3	U	12.3	U	13.5	J	1250		49/50	98%	2%	184.88	123	181.307	217.4064	232.8541
Manganese	0		0		0.57	J	67.6		50/50	100%	0%	4.62	2.75	4.6232	9.466	6.8676
Mercury	0.018	U	0.081	U	0.021	J	0.16	J	30/50	60%	40%	0.05	0.04	0.0355	0.0254	0.0415
Nickel	0.096	U	0.53	U	0.12	J	12.3		43/50	86%	14%	1.3	0.93	1.1328	1.7988	1.5593
Potassium	17.2	U	17.2	U	11.9	J	869	J	49/50	98%	2%	184.13	66.9	180.616	220.0776	232.7964
Selenium	0.23	U	0.27	U	0.24	J	1.3		21/50	42%	58%	0.43	0.32	0.2524	0.215	0.3034
Silver	0.082	U	0.1	U	0.1	J	0.36	J	7/50	14%	86%	0.18	0.15	0.0644	0.0576	0.0781
Sodium	28.7	U	140	U	0		0		0/50	0%	100%	--	--	34.166	12.3326	37.0901
Thallium	0.34	UJ	0.42	UJ	0		0		0/50	0%	100%	--	--	0.1898	0.0126	0.1928
Vanadium	0		0		0.35	J	39		50/50	100%	0%	8.6	6.5	8.604	9.0457	10.7487
Zinc	0.26	U	3.1	U	0.33	J	39.7		25/50	50%	50%	5.92	4.3	3.2935	5.8935	4.6908

APPENDIX K.2
BASE BACKGROUND
SUB-SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

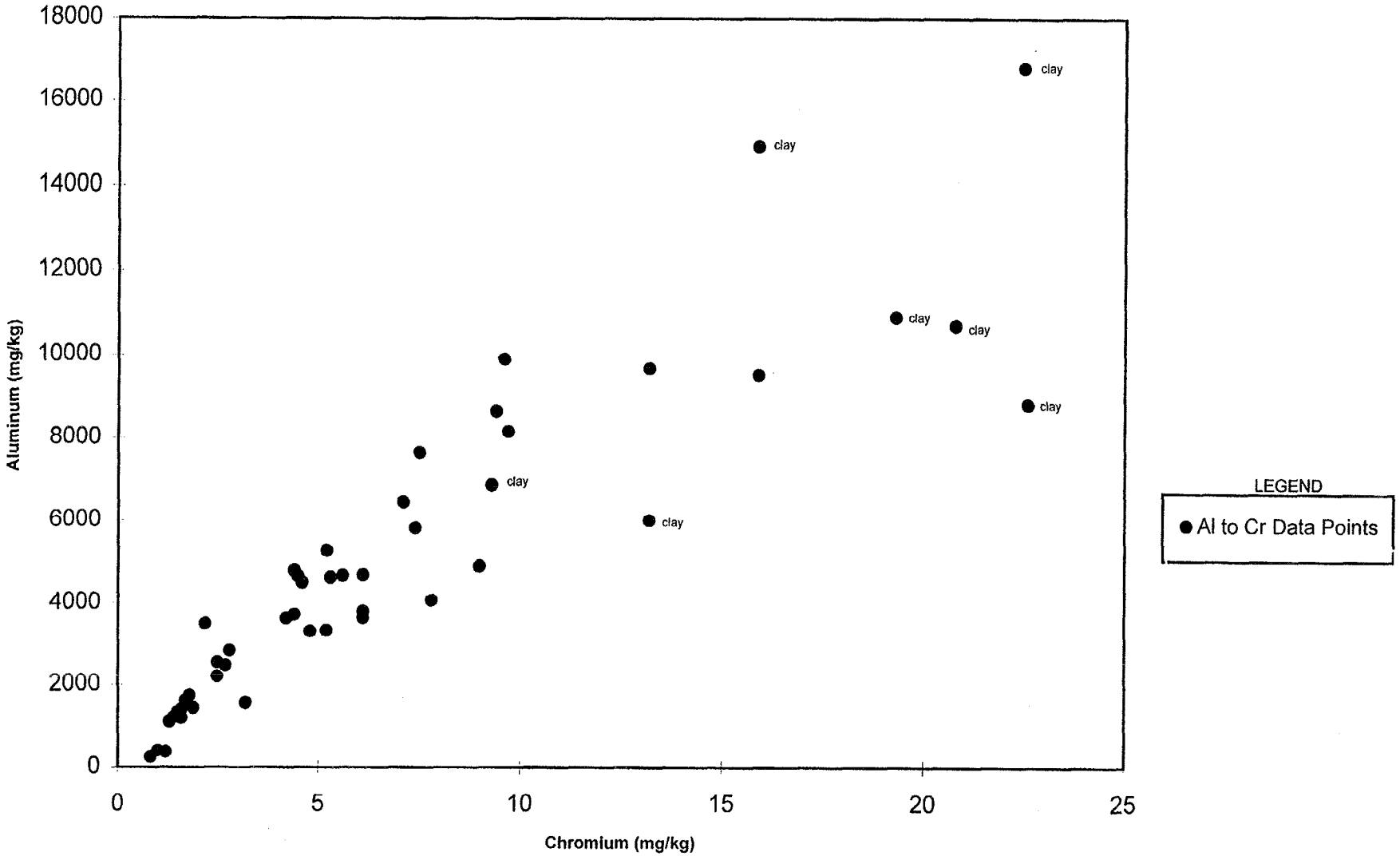
SAMPLE ID SAMPLE DATE	Log Arithmatic Mean Half Non-Detects	Log Standard Deviation	Degree of Freedom	H Statistic	Log Upper 95% Confidence Level	Location of Maximum Detect
METALS (mg/kg)						
Aluminum	8.22	0.94	49	2.327	7812.3412	BASE-BG28-02
Antimony	-1.85	0.49	49	1.884	0.2024	BASE-BG15-03
Arsenic	-1.05	1.3	49	2.915	1.4006	BASE-BG05-02
Barium	1.74	0.94	49	2.327	12.0953	BASE-BG47-04
Beryllium	-3.18	1.17	49	2.607	0.1274	BASE-BG47-04
Cadmium	-4.46	0.06	49	1.687	0.0117	
Calcium	3.95	1.45	49	2.915	273.1219	BASE-BG14-01
Chromium	1.61	0.91	49	2.327	10.2123	BASE-BG15-03
Cobalt	-1.67	1.15	49	2.607	0.5577	BASE-BG47-04
Copper	-0.37	1.16	49	2.607	2.0838	BASE-BG47-04
Iron	7.16	1.29	49	2.915	5086.9045	BASE-BG28-02
Lead	1.25	0.64	49	2.038	5.146	BASE-BG15-03
Magnesium	4.63	1.15	49	2.607	301.3412	BASE-BG47-04
Manganese	1.03	0.83	49	2.224	5.1528	BASE-BG47-04
Mercury	-3.52	0.59	49	1.957	0.0417	BASE-BG45-01
Nickel	-0.54	1.24	49	2.607	2.009	BASE-BG47-04
Potassium	4.49	1.23	49	2.607	301.2788	BASE-BG11-03
Selenium	-1.6	0.62	49	2.038	0.2934	BASE-BG15-03
Silver	-2.91	0.48	49	1.884	0.0693	BASE-BG15-03
Sodium	3.46	0.38	49	1.821	37.862	
Thallium	-1.66	0.07	49	1.687	0.1929	
Vanadium	1.66	1.07	49	2.607	13.7991	BASE-BG15-03
Zinc	0.33	1.37	49	2.915	6.3371	BASE-BG47-04

APPENDIX K.2
BASE BACKGROUND
SUB-SURFACE SOIL ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA

	Lognormal Distribution			Normal Distribution			Sample
	W-Value	Quantile	True/False	W-Value	Quantile	True/False	Count
METALS (mg/kg)							
Aluminum	0.938935839	0.947	FALSE	0.890245967	0.947	FALSE	50
Antimony	0.798671016	0.947	FALSE	0.7379857	0.947	FALSE	50
Arsenic	0.723049774	0.947	FALSE	0.501206701	0.947	FALSE	50
Barium	0.957116676	0.947	TRUE	0.882739321	0.947	FALSE	50
Beryllium	0.961181457	0.947	TRUE	0.515727091	0.947	FALSE	50
Cadmium	0.901351421	0.947	FALSE	0.901030224	0.947	FALSE	50
Calcium	0.956844344	0.947	TRUE	0.30226586	0.947	FALSE	50
Chromium	0.95611354	0.947	TRUE	0.833532713	0.947	FALSE	50
Cobalt	0.922955365	0.947	FALSE	0.348776269	0.947	FALSE	50
Copper	0.947936191	0.947	TRUE	0.780722537	0.947	FALSE	50
Iron	0.968121166	0.947	TRUE	0.661037943	0.947	FALSE	50
Lead	0.968627999	0.947	TRUE	0.868816045	0.947	FALSE	50
Magnesium	0.983968535	0.947	TRUE	0.707759125	0.947	FALSE	50
Manganese	0.941077127	0.947	FALSE	0.330248647	0.947	FALSE	50
Mercury	0.982093224	0.947	TRUE	0.764068056	0.947	FALSE	50
Nickel	0.939729418	0.947	FALSE	0.505385516	0.947	FALSE	50
Potassium	0.952128561	0.947	TRUE	0.740526038	0.947	FALSE	50
Selenium	0.804523777	0.947	FALSE	0.667551305	0.947	FALSE	50
Silver	0.547267945	0.947	FALSE	0.434967266	0.947	FALSE	50
Sodium	0.966272501	0.947	TRUE	0.962778232	0.947	TRUE	50
Thallium	0.918769864	0.947	FALSE	0.91865079	0.947	FALSE	50
Vanadium	0.972159628	0.947	TRUE	0.753542396	0.947	FALSE	50
Zinc	0.952978221	0.947	TRUE	0.497486188	0.947	FALSE	50

APPENDIX K
GRAPH 1

BASE BACKGROUND - COMBINED SUBSURFACE
Scatter Plot
Aluminum vs Chromium



K:\62470\371phase\data\datatable\lejeunebackground\tables\basetables\newstats\regression\Base totalSBRG\Al to Cr01 Chart 1

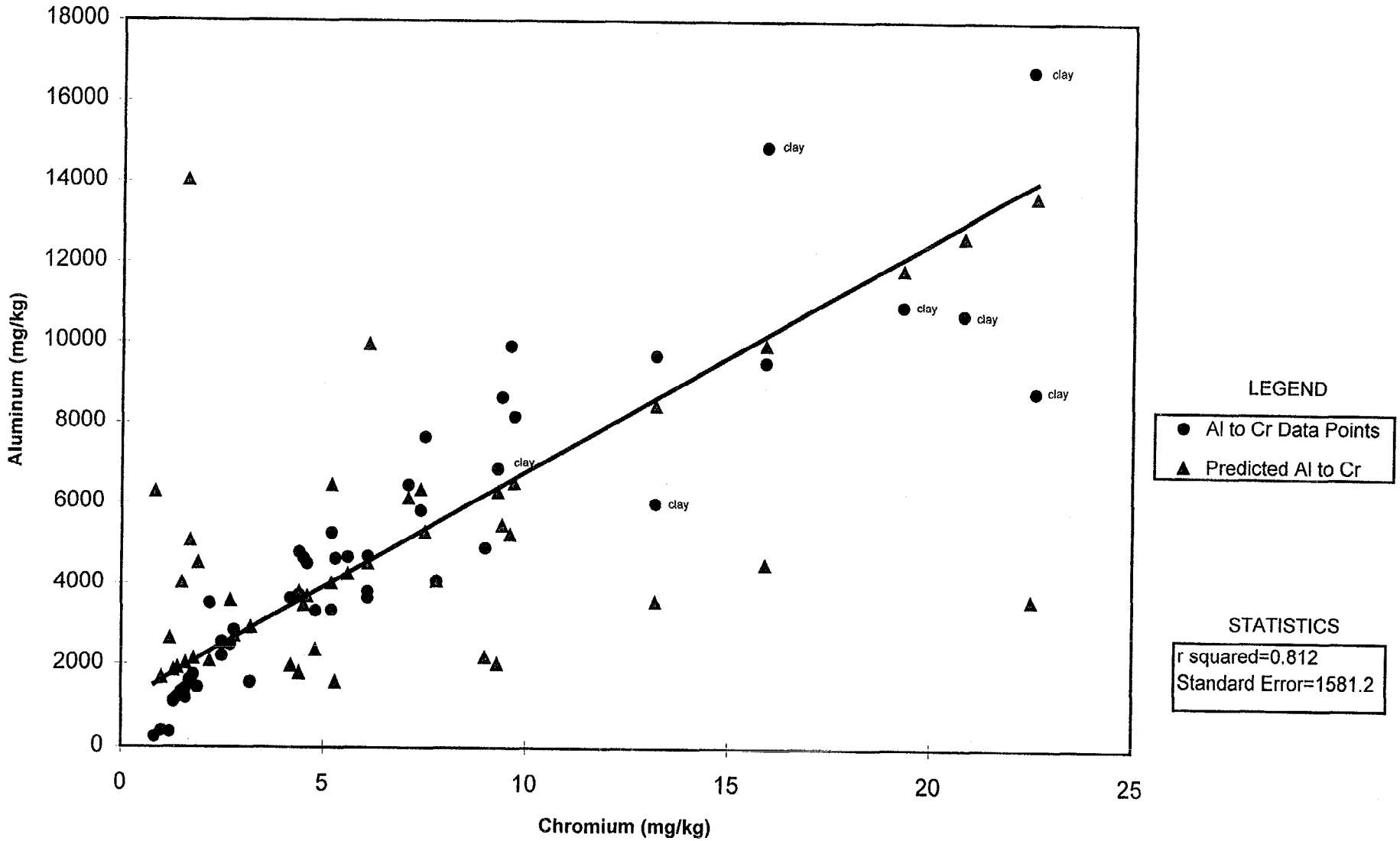
4/10/01

APPENDIX K
GRAPH 2

BASE BACKGROUND - COMBINED SUBSURFACE

Linear Regression

Aluminum vs Chromium



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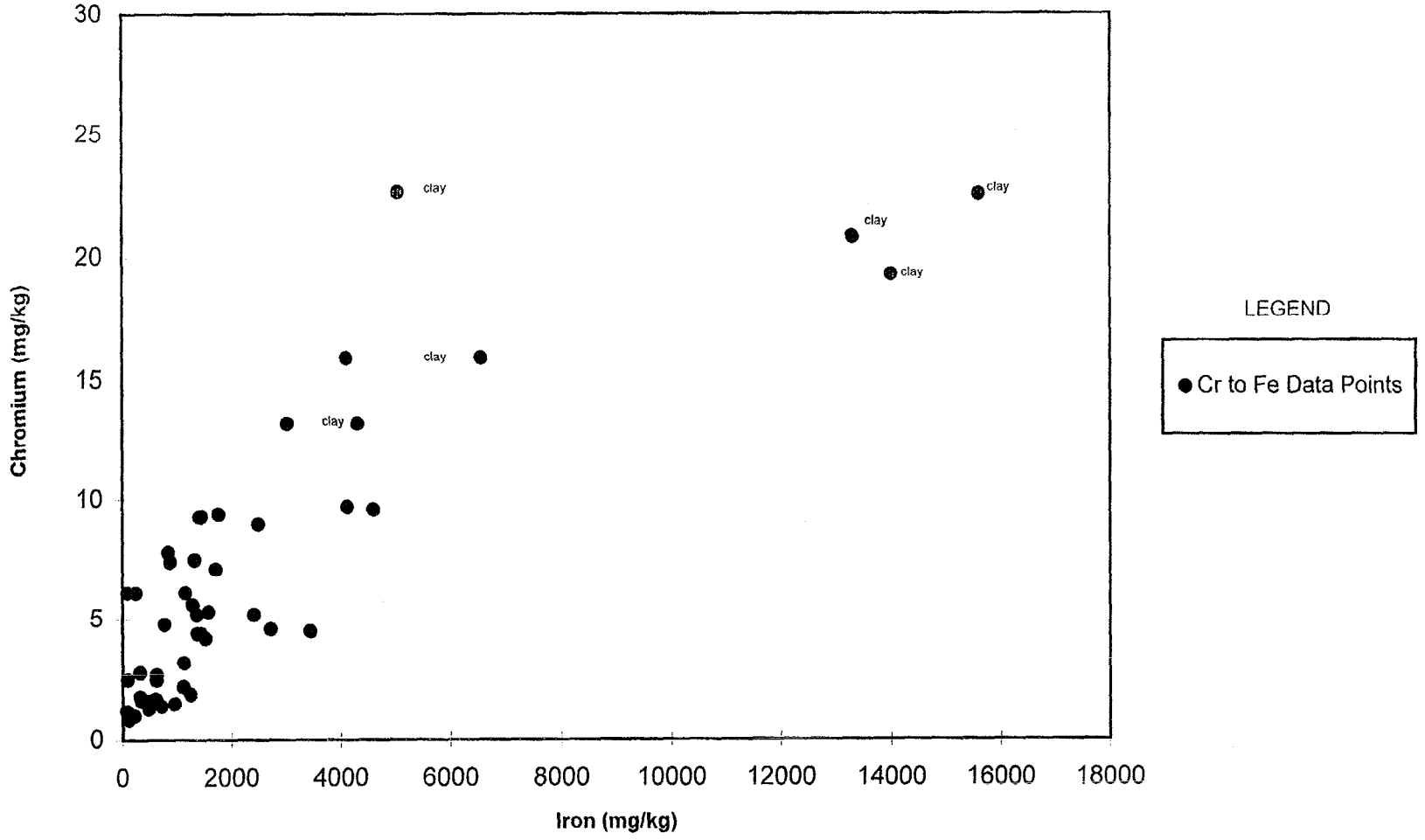
4/10/01

APPENDIX K
GRAPH 3

BASE BACKGROUND - COMBINED SUBSURFACE

Scatter Plot

Chromium vs Iron



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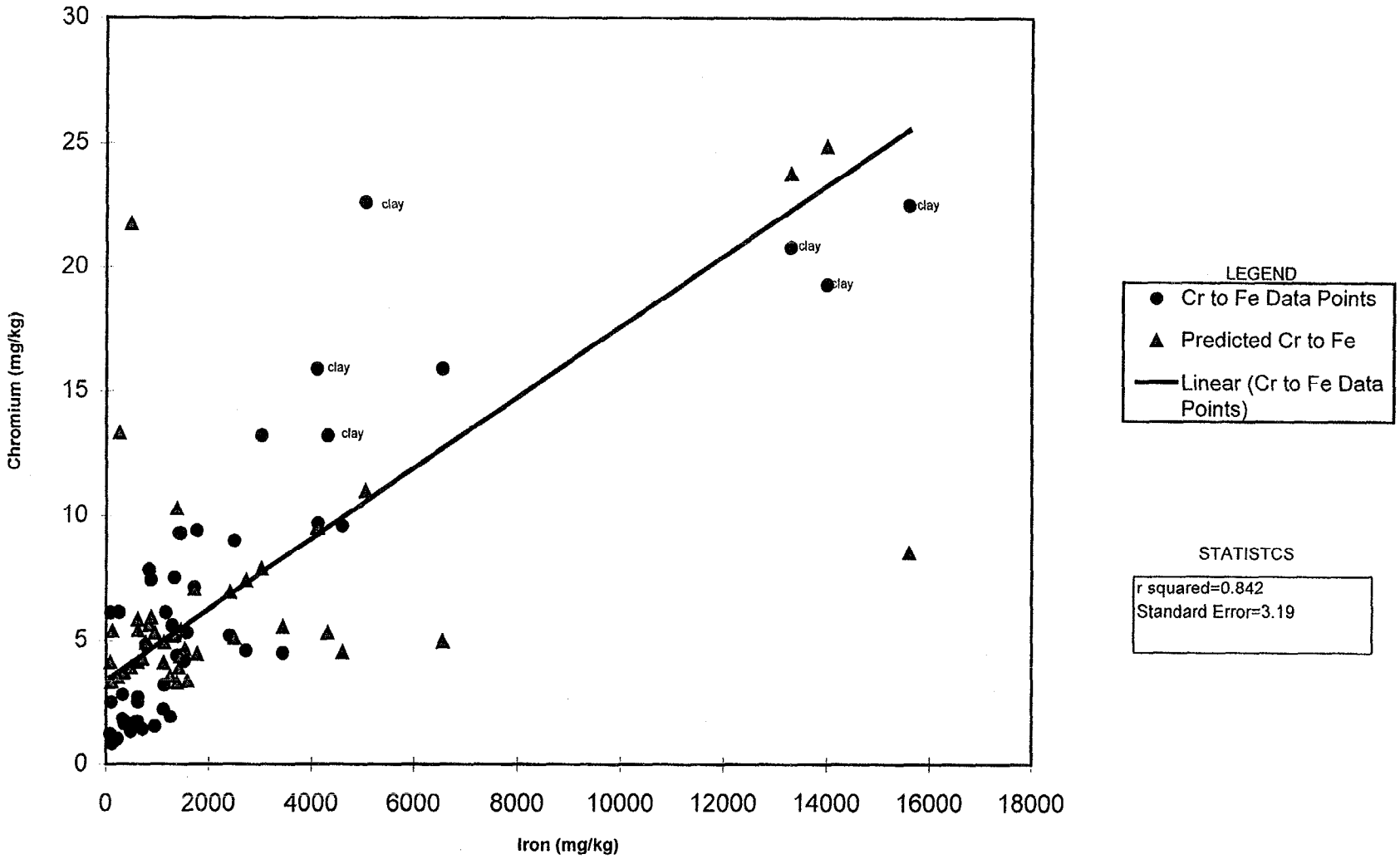
4/10/01

APPENDIX K
GRAPH 4

BASE BACKGROUND - COMBINED SUBSURFACE
Linear Regression
Chromium vs Iron



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APPENDIX L
ANALYTICAL RESULTS FOR QA/QC SAMPLES

APPENDIX L
BLANK ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG04-00D	BASE-BG07-00D	BASE-BG17-04D	BASE-BG18-00D	BASE-BG22-04D	BASE-BG33-00D	BASE-BG39-01D
SAMPLE DATE	7/11/00	7/13/00	7/13/00	7/14/00	7/14/00	7/14/00	7/16/00
METALS (mg/kg)							
Aluminum	9630	1350	3090	1810	4410 J	89	5860 J
Antimony	0.35 UJ	0.23 J	0.23 U	0.2 U	0.24 J	0.24 U	0.31 J
Arsenic	0.83 J	0.27 U	0.31 U	0.27 U	0.26 U	0.33 U	0.32 U
Barium	16.5	5.1	3.9	3.2	6.2	0.79 J	8.2
Beryllium	0.12 J	0.029 J	0.036 J	0.023 J	0.039 J	0.021 J	0.012 U
Cadmium	0.022 U	0.021 U	0.024 U	0.021 U	0.02 U	0.025 U	0.025 U
Calcium	223	220	75.7 J	38.1 J	22 J	45 U	19.4 J
Chromium	10.1	1.6	4	1.5	5.1	0.45 U	5.4
Cobalt	0.42 J	0.084 U	0.13 J	0.084 U	0.15 J	0.1 U	0.19 J
Copper	1.3	0.4 U	0.75 U	0.59	0.89 U	0.51 U	0.87 U
Iron	6770	1060	604	1210	642 J	102	1540 J
Lead	7.4 J	6.2 J	3.2 J	2.9 J	3.1 J	2.5	4.1 J
Magnesium	289	25.7 J	96.8 J	31.2 J	116	15.8 U	174
Manganese	6.4	1.2 J	1.8 J	3.6 J	1.6	2.4 J	2.7
Mercury	0.051	0.047 U	0.033 U	0.041 U	0.017 U	0.063 U	0.019 U
Nickel	1.9	0.25 J	0.47 J	0.49 J	0.38 J	0.11 U	0.51 J
Potassium	148 J	33.4 J	115 J	19.7 J	133	13.9 U	91.2 J
Selenium	0.5 J	0.23 UJ	0.26 UJ	0.23 UJ	0.34 J	0.28 U	0.55 J
Silver	0.1 J	0.084 U	0.096 U	0.084 U	0.081 U	0.1 U	0.098 U
Sodium	37.3 U	60 U	70 U	68.4 U	87 U	63.5 U	115 U
Thallium	0.37 UJ	0.35 UJ	0.39 UJ	0.35 UJ	0.33 UJ	0.42 UJ	0.41 UJ
Vanadium	15.8	3.1	3.9	3.2	4.7	0.68 J	6.5
Zinc	5.5	1.8 U	1.9 U	3.3	0.41 J	1.1 J	5.6

APPENDIX L
BLANK ANALYTICAL RESULTS
BACKGROUND STUDY
MCB, CAMP LEJEUNE, NORTH CAROLINA
CTO-0371

SAMPLE ID	BASE-BG41-01D	BASE-BG44-03D	BASE-BG45-01D	BASE-BG49-02D
SAMPLE DATE	7/15/00	7/16/00	7/17/00	7/12/00
METALS (mg/kg)				
Aluminum	2920	3920	4500	9080
Antimony	0.22 U	0.22 UJ	0.26 UJ	0.23 UJ
Arsenic	0.31 U	0.3 U	7.7	2.7
Barium	2.7	6.1	5.1	9.5
Beryllium	0.042 J	0.025 J	0.042 J	0.17 J
Cadmium	0.024 U	0.023 U	0.023 U	0.024 U
Calcium	76.5 J	45.1 J	31.8 J	185
Chromium	4.1	4.7	8.6	13.3
Cobalt	0.095 U	0.24 J	0.18 J	0.28 J
Copper	0.52 U	0.62	0.88	2.4
Iron	686	792	4720	7700
Lead	2.8 J	2.4	4	5.3 J
Magnesium	20.9 J	108 J	154	273
Manganese	1.7 J	2.5	2.5	4.8
Mercury	0.046 U	0.046 J	0.066 J	0.019 U
Nickel	0.52 J	0.56 J	0.48 J	0.79
Potassium	15.4 J	85.6 J	122 J	404 J
Selenium	0.26 UJ	0.25 U	0.25 U	0.56 J
Silver	0.095 U	0.091 U	0.13 J	0.14 J
Sodium	45.7 U	100 U	101 U	33.8 U
Thallium	0.39 UJ	0.38 UJ	0.38 UJ	0.4 UJ
Vanadium	1.8 J	4.3	6.9	14.7
Zinc	1 U	3.1	3.7	4.7